PUBLIC NOTICE

NOTICE IS HEREBY GIVEN THAT the Tooele City Planning Commission will meet in a business meeting scheduled for ***Wednesday, March 23, 2022*** at the hour of 7:00 p.m. The meeting will be held in the City Council Chambers of Tooele City Hall, located at 90 North Main Street, Tooele, Utah.

We encourage anyone interested to join the Planning Commission meeting electronically by logging on to the Tooele City Facebook page, at https://www.facebook.com/tooelecity. If you would like to submit a comment for any public hearing item you may email pcpubliccomment@tooelecity.org anytime after the advertisement of this agenda and before the close of the hearing for that item during the meeting. Emails will only be read for public hearing items at the designated points in the meeting.

AGENDA

1. ***Pledge of Allegiance***

2. ***Roll Call***

3. ***Recommendation*** on a Zoning Map Amendment by the SJ Managing Company for the Proposed One O'Clock Hill Development to Reassign the Zoning for Approximately 38 Acres Located at Approximately 900 South Main Street (South Side of SR-36) from the RR-1 Residential Zoning District with the Sensitive Area Overlay to the R1-7 Residential Zoning District and Removing the Sensitive Area Overlay from the Development Portions of the Property. ***(Continued from September 8, 2021 Meeting)***

4. ***Public Hearing and Recommendation*** on a City Code Text Amendment Request by Tooele City for Ordinance 2022-10 An Ordinance of the Tooele City Council Proposing Amendments to Chapter 7-24 of the Tooele City Code Regarding Annexation.

5. ***Public Hearing and Recommendation*** on a City Code Text Amendment Request by Tooele City to Revise the Provisions of Table 2 of Chapter 7-16 of the Tooele City Code to Amend Certain Setback Requirements in the Various Nonresidential Zoning Districts.

6. ***Discussion*** on Ordinance 2022-11 An Ordinance of Tooele City Enacting a Temporary Zoning Ordinance Regarding Garage Parking in Multi-Family Residential Developments.

7. ***City Council Reports***

8. ***Review and Approval*** of Planning Commission Minutes for the Meeting Held on March 9, 2022.

9. ***Adjourn***

Pursuant to the Americans with Disabilities Act, individuals needing special accommodations during this meeting should notify Andrew Aagard, Tooele City Planner and Zoning Administrator prior to the meeting at (435) 843-2132.

STAFF REPORT

August 26, 2021

To: Tooele City Planning Commission
Business Date: September 8, 2021

From: Planning Division
Community Development Department

Prepared By: Andrew Aagard, City Planner / Zoning Administrator

Re: **One O'Clock Hill – Zoning Map Amendment Request**

Application No.:	P21-860
Applicant:	Shaun Johnson, representing SJ Managing Company
Project Location:	Approximately 900 South Main Street
Zoning:	RR-1 Residential Zone Sensitive Area Overlay
Acreage:	Approximately 38 Acres (Approximately 1,655,280 ft^2)
Request:	Request for approval of a Zoning Map Amendment in the RR-1 Residential Sensitive Area Overlay zone regarding reassigning the zoning to R1-7 Residential and removing the Sensitive Area Overlay on the developable portions of the property.

BACKGROUND

This application is a request for approval of a Zoning Map Amendment for approximately 38 acres located at approximately 900 South Main Street (SR-36). The property is currently zoned RR-1 Residential and bears the Sensitive Area Overlay. The applicant is requesting that a Zoning Map Amendment be approved to reassign the zoning for the property to the R1-7 Residential zoning district and to remove the 38 acres of developable ground from the Sensitive Area Overlay.

This item was tabled from the September 8, 2021 Planning Commission meeting pending applicant's submittal of a traffic study, a soil and geological study and information on the relocation of the power lines in the area. The public hearing was opened and closed at that meeting. The applicant has provided the requested information. It is included in this packet.

ANALYSIS

General Plan and Zoning. The Land Use Map of the General Plan calls for the Medium Density Residential land use designation for the subject property. The property has been assigned the RR-1 Residential zoning classification, supporting approximately one dwelling unit per acre. The RR-1 Residential zoning designation is not identified by the General Plan as a preferred zoning classification for the Medium Density Residential land use designation. The property is long an narrow running south west to north east and is adjacent to various zoning districts. To the north west, on the adjacent side of SR-36 properties are zoned NC Neighborhood Commercial, GC General Commercial and R1-7 Residential. To the east on the adjacent side of Settlement Canyon Road properties are zoned R1-12 Residential. To the south east properties are zoned MU-160 Multiple Use. Mapping pertinent to the subject request can be found in Exhibit "A" to this report.

The Land Use Map of the Tooele City General Plan designates the entire length of this property as Medium Density Residential (MDR). The MDR designation includes the R1-7, R1-8 and R1-10

Residential zoning districts. The applicant's request to reassign the zoning to the R1-7 Residential zone does comply with the MDR designation.

The property is current zoned RR-1 Residential. The purpose of the RR-1 Residential zoning district is to provide for single family residential areas and single family dwelling units on larger individual lots. Additionally these districts are intended to allow and make available Rural Residential opportunities and agricultural uses protected from the encroachment of incompatible uses. The RR-1 Residential zone also permits large animals such as horses, cows and llamas.

The R1-7 zoning district differs substantially from the RR-1 zoning district. One of those differences is lot size and density. The R1-7 zoning district permits a minimum lot size of 7,000 square feet and a density of 5 units per acre where the RR-1 zone is 1 dwelling unit per acre. The R1-7 zoning district does not permit the keeping of large animals.

The property also bears the Sensitive Area Overlay. The purpose of the Sensitive Area Overlay to provide regulatory standards, guidelines, and criteria having the effect of minimizing flooding, erosion, destruction of natural plant and wildlife habitat, alteration of natural drainages, and other environmental hazards, and protecting the natural scenic character of the hillside and mountain areas. In support of this purpose and intent, this Chapter recognizes the importance of the unique hillside and mountain areas of Tooele City to the scenic character, heritage, history, and identity of Tooele City and of adjoining areas of unincorporated Tooele County. In support of this purpose and intent, Tooele City finds that it is in the public interest to regulate the development of sensitive areas in a manner so as to minimize the adverse impacts of development on scenic open spaces and on sensitive or vulnerable organic and inorganic systems. The Sensitive Area Overlay provides additional development requirements when development is proposed on sensitive areas or areas with potential natural hazards. Some of those additional requirements include but are not limited to, slope restrictions, lot sizes, lot widths, buildable areas, cut and fill and so forth.

This property rests immediately at the foot of One O'Clock and Two O'Clock mountains and does contain potential natural hazards such as rock outfalls, faults, and slide potential. The property is also criss-crossed by numerous power lines. These issues will need to be addressed during the subdivision review process to ensure proper and safety in the development.

The property is also encumbered by the Southern Gateway Overlay district. This Gateway Overlay is in place to ensure an attractive and desirable streetscape for visually prominent areas and entries to the City. The Gateway Overlay encourages emphasis on streetscape landscaping, building architecture and parking location. It also requires Planning Commission approval of site plan development. Subdivisions already go through Planning Commission approval so the Gateway Overlay district really doesn't apply. It also has no bearing on land use, zoning, etc.

Subdivision Layout. The applicant has provided a master plan concept showing their intentions for subdivision of the 38 acre parcel. This is not a subdivision application and the concept plan has been provided for the Planning Commission's information only. The subdivision is proposing multiple accesses onto SR-36 which is a UDOT highway. The only City Street that will bear an impact from the potential development will be Settlement Canyon Road where a connection is being proposed just south of the Masonic Temple. The applicant will need to coordinate with UDOT for the other access points onto SR-36. It should be noted that there are approximately 7 acres consisting of 4 lots towards the south end of the development that are not participating in this Zoning Map Amendment and will maintain their existing zoning. The Mason Temple on the north east end of the proposed development is not participating in this proposed amendment and will maintain the current zoning.

Even though the subdivision is not being considered for approval at this time, a Zoning Map amendment is a good time for the Commission to negotiate with the developer and obtain what they would like to see as a condition of zoning. The Commission may table the application for additional information, changes to the concept plan and so forth. The Planning Commission is not obligated to render a decision at this meeting if it needs more information.

Criteria For Approval. The criteria for review and potential approval of a Zoning Map Amendment request is found in Section 7-1A-7 of the Tooele City Code. This section depicts the standard of review for such requests as:

(1) No amendment to the Zoning Ordinance or Zoning Districts Map may be recommended by the Planning Commission or approved by the City Council unless such amendment or conditions thereto are consistent with the General Plan. In considering a Zoning Ordinance or Zoning Districts Map amendment, the applicant shall identify, and the City Staff, Planning Commission, and City Council may consider, the following factors, among others:
   - (a) The effect of the proposed amendment on the character of the surrounding area.
   - (b) Consistency with the goals and policies of the General Plan and the General Plan Land Use Map.
   - (c) Consistency and compatibility with the General Plan Land Use Map for adjoining and nearby properties.
   - (d) The suitability of the properties for the uses proposed viz. a. viz. the suitability of the properties for the uses identified by the General Plan.
   - (e) Whether a change in the uses allowed for the affected properties will unduly affect the uses or proposed uses for adjoining and nearby properties.
   - (f) The overall community benefit of the proposed amendment.

REVIEWS

Planning Division Review. The Tooele City Planning Division has completed their review of the Zoning Map Amendment submission and has issued the following proposed comments:

1. The property has the Sensitive Area Overlay because of slope and geological hazards such as slide potential, drainage, rock outfall, faults and so forth.
2. Numerous power lines criss-cross the property.
3. The R1-7 Residential zone does comply with the Medium Density Residential designation of the Tooele City Land Use Map.
4. The Masonic Temple and the 7 acres of property located to the south end of the proposed development are not participating in this this amendment request and will maintain the existing zoning.
5. The zoning map amendment is proposed only for the 38 acres that will be developed.

Engineering Review. The Tooele City Engineering division has completed their review of the Zoning Map Amendment submission and has not issued any comments.

Public Works. The Tooele City Public Works Division has completed their review of the Zoning Map Amendment submission and has not issued any comments.

Noticing. The applicant has expressed their desire to rezone the subject property and do so in a manner which is compliant with the City Code. As such, notice has been properly issued in the manner outlined in the City and State Codes.

STAFF RECOMMENDATION

Staff recommends the Planning Commission carefully weigh this request for a Land Use Map Amendment according to the appropriate tenets of the Utah State Code and the Tooele City Code, particularly Section 7-1A-7(1) and render a decision in the best interest of the community with any conditions deemed appropriate and based on specific findings to address the necessary criteria for making such decisions.

Potential topics for findings that the Commission should consider in rendering a decision:

1. The effect of the proposed application on the character of the surrounding area.
2. The degree to which the proposed application is consistent with the intent, goals, and objectives of any applicable master plan.
3. The degree to which the proposed application is consistent with the intent, goals, and objectives of the Tooele City General Plan.
4. The degree to which the proposed application is consistent with the requirements and provisions of the Tooele City Code.
5. The suitability of the properties for the uses proposed.
6. The degree to which the proposed application will or will not be deleterious to the health, safety, and general welfare of the general public or the residents of adjacent properties.
7. The degree to which the proposed application conforms to the general aesthetic and physical development of the area.
8. Whether a change in the uses allowed for the affected properties will unduly affect the uses or proposed uses for adjoining and nearby properties.
9. The overall community benefit of the proposed amendment.
10. Whether or not public services in the area are adequate to support the subject development.
11. Other findings the Commission deems appropriate to base their decision upon for the proposed application.

MODEL MOTIONS

Sample Motion for a Positive Recommendation – “I move we forward a positive recommendation to the City Council for the One O'Clock Hill Zoning Map Amendment Request by Shaun Johnson, representing the SJ Managing Company reassigning the zoning of the property to R1-7 and removing the Sensitive Area Overlay, application number P21-860, based on the findings and subject to the conditions listed in the Staff Report dated August 26, 2021:”

1. List any additional findings and conditions…

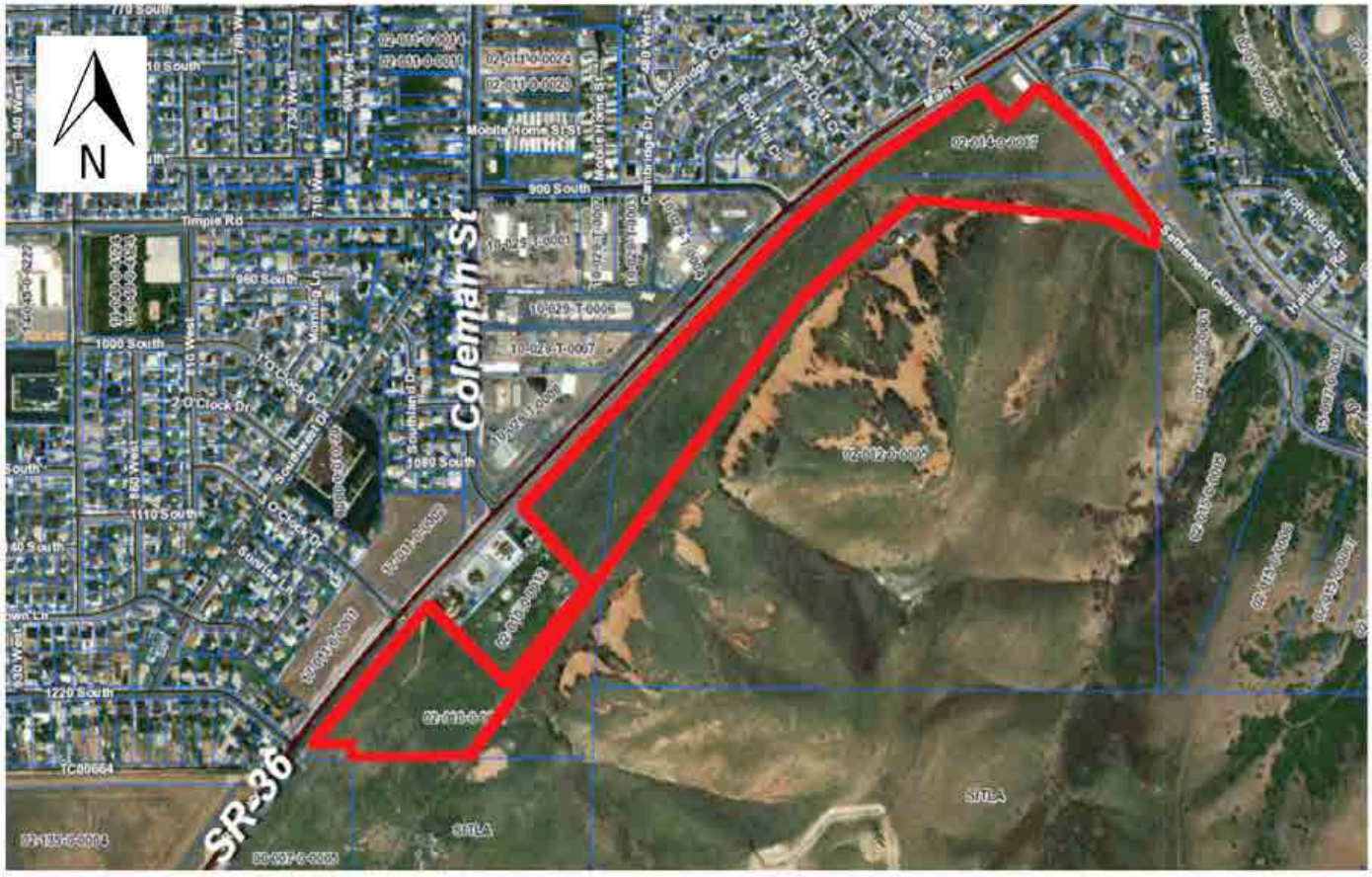
Sample Motion for a Negative Recommendation – “I move we forward a negative r recommendation to the City Council for the One O'Clock Hill Zoning Map Amendment Request by Shaun Johnson, representing the SJ Managing Company reassigning the zoning of the property to R1-7 and removing the Sensitive Area Overlay, application number P21-860, based on the following findings:”

1. List findings…

EXHIBIT A

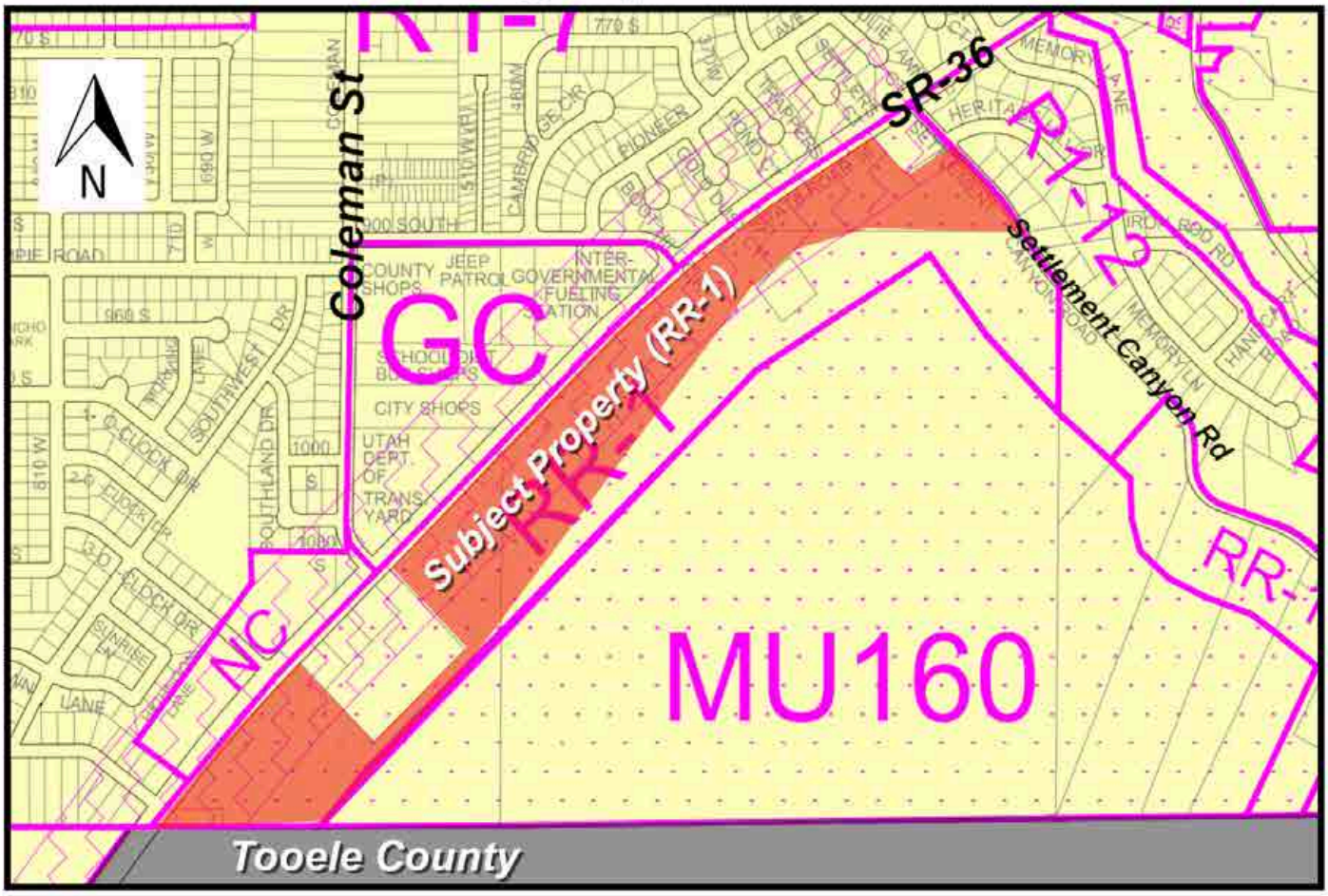
MAPPING PERTINENT TO THE ONE O'CLOCK HILL ZONING MAP AMENDMENT

One O'Clock Hill Zoning Map Amendment



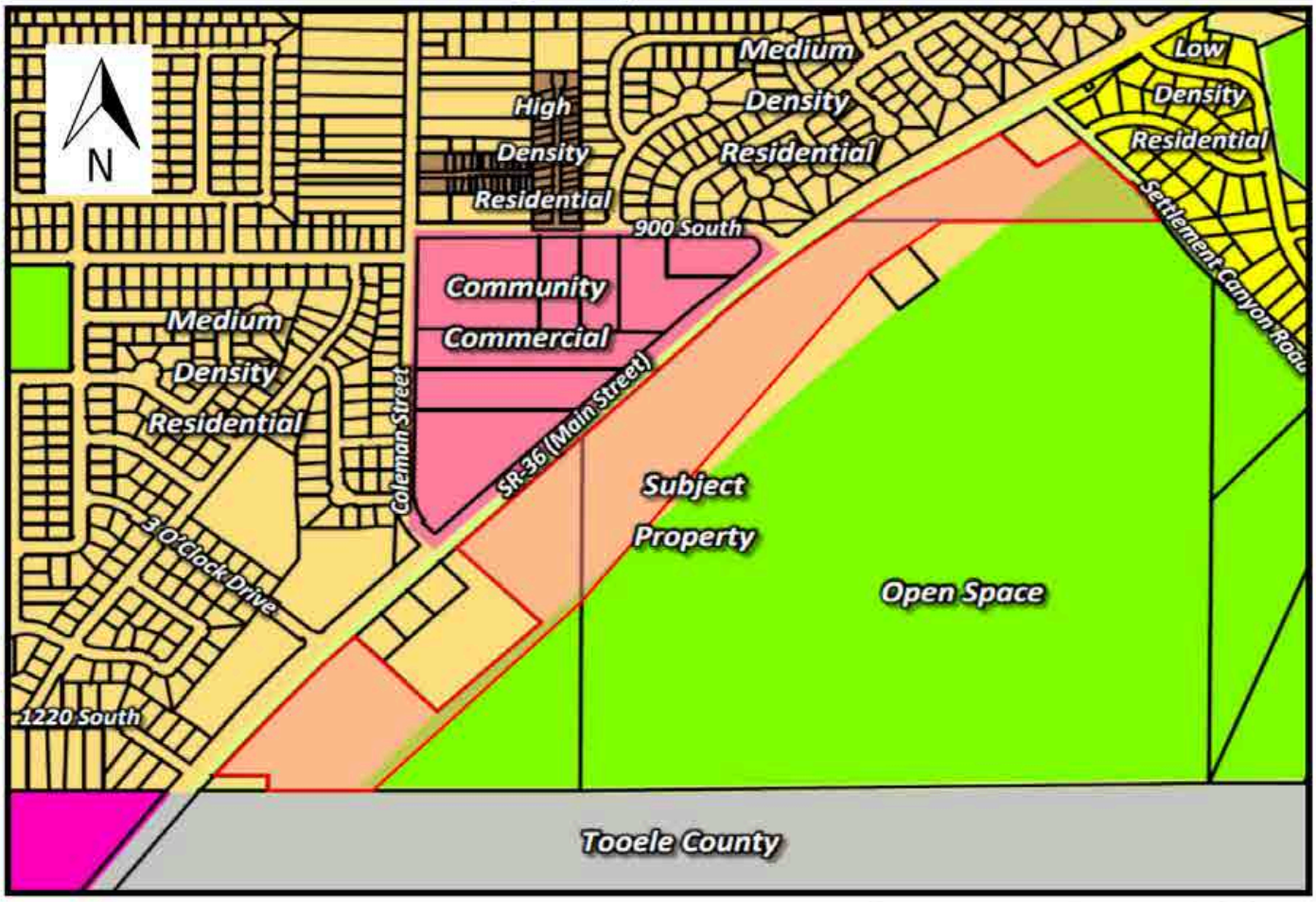
Aerial View

One O'Clock Hill Zoning Map Amendment



Current Zoning

One O'Clock Hill Zoning Map Amendment



Current Land Use

EXHIBIT B

APPLICANT SUBMITTED INFORMATION

Andrew Aagard

From: Paul Hansen
Sent: Thursday, March 17, 2022 4:08 PM
To: Jim Bolser; Andrew Aagard
Cc: Debbie Winn; Jared Stewart
Subject: FW: Shawn Johnson Development in Tooele City

I received the following from UDOT regarding their review of the traffic study for the One O'Clock development.

Paul Hansen, P.E. | City Engineer
Tooele City Corporation | 90 North Main Street | Tooele, Utah 84074
(ph) 435.843.2132 | (fax) 435.843.2139 | www.tooelecity.org

From: Nazee Treweek <ntreweek@utah.gov>
Sent: Thursday, March 17, 2022 11:53 AM
To: Paul Hansen <PaulH@TooeleCity.org>
Cc: Kim Velasquez <kvelasquez@utah.gov>; Megan Leonard <mleonard@utah.gov>
Subject: Re: Shawn Johnson Development in Tooele City

We did review it. And I think overall we are ok with it. We will most likely have them make the access you have circled an emergency only access though.

On Wed, Mar 16, 2022 at 11:47 AM Paul Hansen <PaulH@tooelecity.org> wrote:

> We are following up to see what if anything has been reviewed or discussed the developer Shaun Johnson and the One O'Clock TIS. We fully understand that UDOT will not issue an access permit until the development is ready to proceed and has filed all required paperwork. However, the City Planning Commission will not consider their rezone request until we at least have some minimal level of review from UDOT. As we discussed in a recent global project review of Tooele City Projects, we ask if there were any compelling opposition to SR-36 access, as shown in the following image. The full report is attached. I believe that your preliminary indication was than all three new accesses from the southeast could occur, but that you needed to look at the one offset from Coleman.
>
> Have you been able to provide at least a conceptual opinion on the four (4) new accesses shown?

From: Kim Velasquez <kvelasquez@utah.gov>
Sent: Wednesday, March 16, 2022 11:06 AM
To: Paul Hansen <PaulH@TooeleCity.org>
Subject: Re: Shawn Johnson Development in Tooele City

If you have questions on your project the best person to contact would be Nazee Treweek or Megan Leonard.

Their contact info is Megan 801-887-8767 her email is mleonard@utah.gov

Nazee 801-975-4810 her email is ntreweek@utah.gov

If I can help with anything else let me know!

On Tue, Mar 15, 2022 at 2:09 PM Paul Hansen <PaulH@tooelecity.org> wrote:

Kim:

Would you mind a quick call to discuss this project?

Paul Hansen, P.E. | City Engineer

Tooele City Corporation | 90 North Main Street | Tooele, Utah 84074

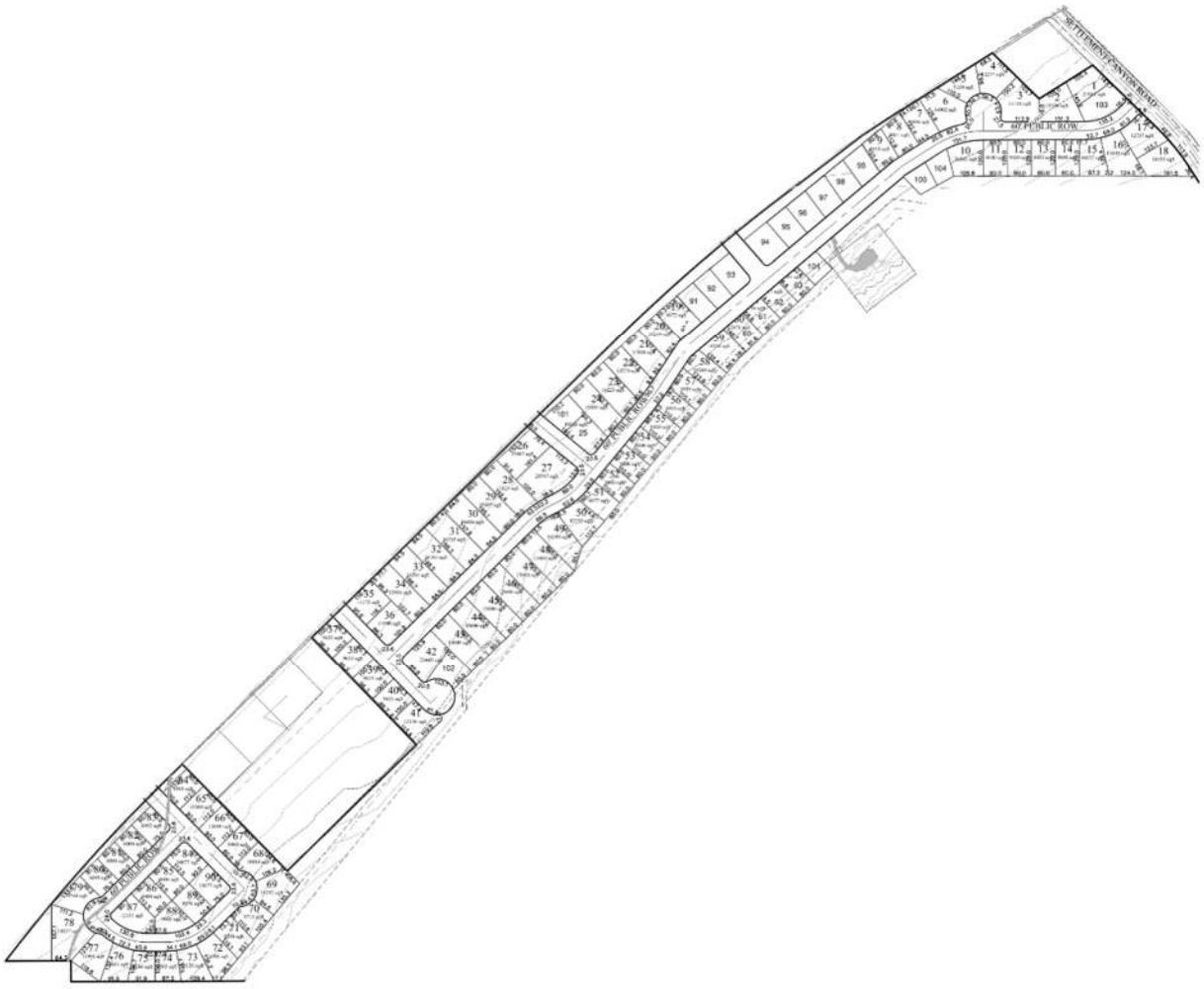
(ph) 435.843.2132 | (fax) 435.843.2139 | www.tooelecity.org

From: Kim Velasquez <kvelasquez@utah.gov>
Sent: Thursday, February 17, 2022 10:41 AM
To: Shaun Johnson <Shaun@sjcompany.net>
Cc: Jared Stewart <jareds@TooeleCity.org>; Jim Bolser <jimb@TooeleCity.org>; Andrew Aagard <AndrewA@TooeleCity.org>; Debbie Winn <dwinn@TooeleCity.org>; Paul Hansen <PaulH@TooeleCity.org>
Subject: Re: UDOT Meeting

HALES ENGINEERING
innovative transportation solutions

One O'clock Hill

Traffic Impact Study



Tooele, Utah

October 14, 2021

UT21-2019

LICENSED PROFESSIONAL ENGINEER
NO. 295699
RYAN R.
HALES
10/14/2021
STATE OF UTAH

1220 North 500 West, Ste. 202 Lehi, UT 84043 p 801.766.4343
www.halesengineering.com

EXECUTIVE SUMMARY

This study addresses the traffic impacts associated with the proposed One O'clock Hill development located in Tooele, Utah. The One O'clock Hill development is located on the southeast side of Main Street (S.R. 36), between Settlement Canyon Road and 1220 South.

The purpose of this traffic impact study is to analyze traffic operations at key intersections for existing (2021) and future (2026) conditions, with and without the proposed project, and to recommend mitigation measures as needed. The evening peak hour level of service (LOS) results are shown in Table ES-1. Recommended storage lengths are shown in Table ES-2.

Table ES-1: Evening Peak Hour Level of Service Results

	Intersection	Level of Service			
		Existing (2021)		Future (2026)	
		BG	PP	BG	PP
1	Settlement Canyon Road / Main Street (S.R. 36)	b	b	b	d
2	900 South & Access 2 / Main Street (S.R. 36)	b	b	c	c
3	Bus Depot Access & Access 3 / Main Street (S.R. 36)	b	b	c	c
4	Coleman Street / Main Street (S.R. 36)	c	c	c	c
5	3 O'clock Drive & Access 5 / Main Street (S.R. 36)	b	c	b	c
6	Access 4 / Main Street (S.R. 36)	-	a	-	a

1. Intersection LOS values represent the overall intersection average for roundabout, signalized, and all-way stop-controlled (AWSC) intersections (uppercase letter) and the worst movement for all other unsignalized intersections (lowercase letter)
2. BG = Background (without project traffic), PP = Plus Project (with project traffic)

Source: Hales Engineering, October 2021

Table ES-2: Recommended Storage Length

	Intersection	Recommended Storage Lengths (feet)															
		NB (S.R. 36)				SB (S.R. 36)				EB				WB			
		LT		RT		LT		RT		LT		RT		LT		RT	
		E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
1	Settlement Canyon Road / Main Street (S.R. 36)	-	-	100	-	-	**100**	-	-	-	-	-	-	-	-	-	-
2	900 South & Access 2 / Main Street (S.R. 36)	100	-	-	-	100	**100**	-	-	-	-	-	-	-	-	-	-
3	Bus Depot Access & Access 3 / Main Street (S.R. 36)	100	-	-	-	-	**100**	530	-	-	-	-	-	-	-	-	-
4	Coleman Street / Main Street (S.R. 36)	100	-	-	-	-	-	100	-	-	-	60	**75**	-	-	-	-
5	3 O'clock Drive & Access 5 / Main Street (S.R. 36)	-	-	-	-	-	**100**	100	-	-	-	-	-	-	-	-	-
6	Access 4 / Main Street (S.R. 36)	-	-	-	-	-	**100**	-	-	-	-	-	-	-	-	-	-

1. Storage lengths are based on 2026 95th percentile queue lengths and do not include required deceleration / taper distances
2. E = Existing storage length (approximate), if applicable; P = proposed storage length for new turn lanes or changes to existing turn lanes, if applicable

Source: Hales Engineering, October 2021

SUMMARY OF KEY FINDINGS & RECOMMENDATIONS

Project Conditions

- The development will consist of residential single-family units
- The project is anticipated to generate approximately 1,056 weekday daily trips, including 78 trips in the morning peak hour, and 105 trips in the evening peak hour

2021	Background	Plus Project
Assumptions	• None	• SB left-turn pockets required for all project accesses to S.R. 36 per UDOT R930-6
Findings	• Acceptable LOS at all study intersections	• Acceptable LOS at all study intersections
2026	**Background**	**Plus Project**
Assumptions	• Background traffic grown using historic annual growth rate from UDOT AADT data	• None
Findings	• Acceptable LOS at all study intersections	• Acceptable LOS at all study intersections

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I. INTRODUCTION

A. Purpose

This study addresses the traffic impacts associated with the proposed One O'clock Hill development located in Tooele, Utah. The proposed project is located on the southeast side of Main Street (S.R. 36), between Settlement Canyon Road and 1220 South. Figure 1 shows a vicinity map of the proposed development.

The purpose of this traffic impact study is to analyze traffic operations at key intersections for existing (2021) and future (2026) conditions, with and without the proposed project, and to recommend mitigation measures as needed.

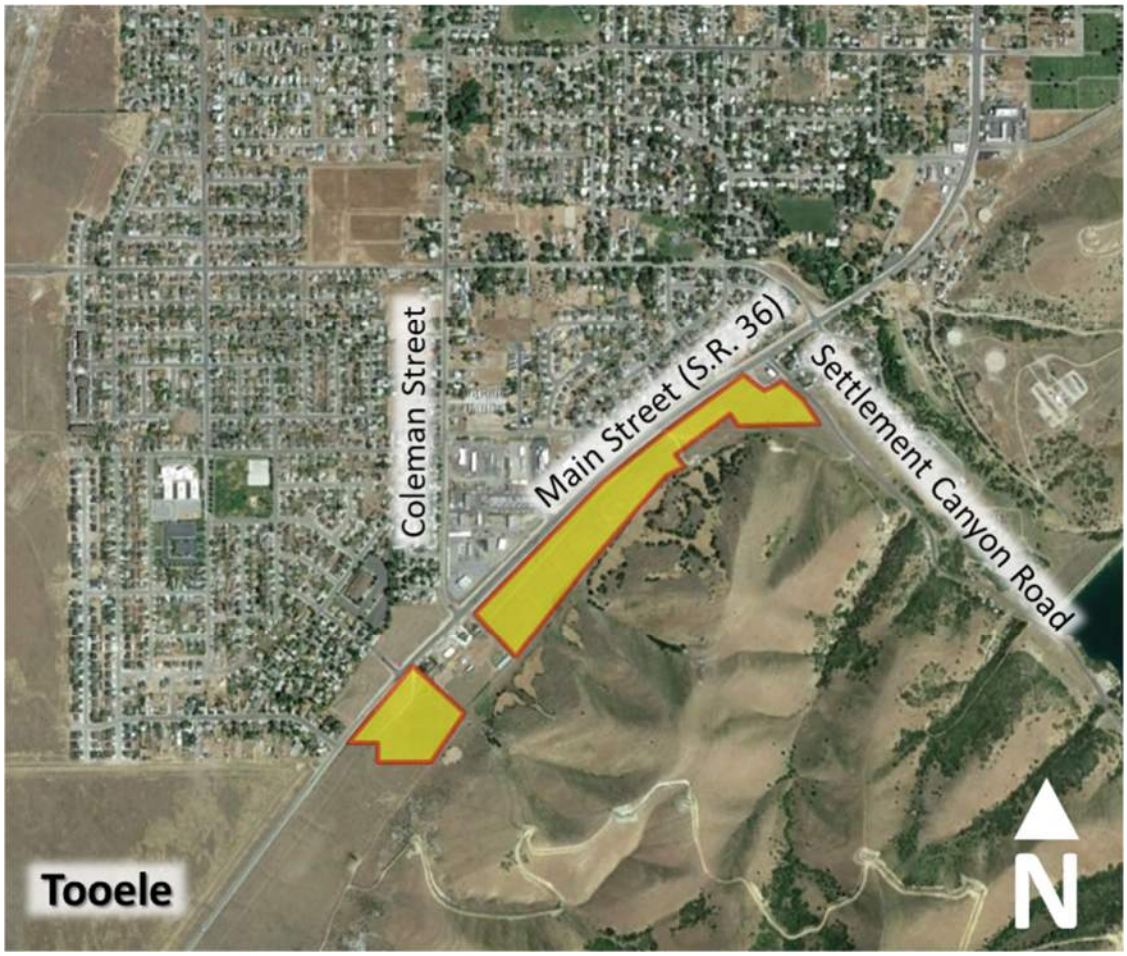

Figure 1: Vicinity map showing the project location in Tooele, Utah

B. Scope

The study area was defined based on conversations with the development team. This study was scoped to evaluate the traffic operational performance impacts of the project on the following intersections:

- Settlement Canyon Road / Main Street (S.R. 36)
- 900 South / Main Street (S.R. 36)
- Tooele School Bus Depot Access / Main Street (S.R. 36)
- Coleman Street / Main Street (S.R. 36)
- 3 O'clock Drive / Main Street (S.R. 36)
- New project accesses (5) / Main Street (S.R. 36)

C. Analysis Methodology

Level of service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst. Table 1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections.

The *Highway Capacity Manual* (HCM), 6th Edition, 2016 methodology was used in this study to remain consistent with "state-of-the-practice" professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized, roundabout, and all-way stop-controlled (AWSC) intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For all other unsignalized intersections, LOS is reported based on the worst movement.

Using Synchro/SimTraffic software, which follow the HCM methodology, the peak hour LOS was computed for each study intersection. Multiple runs of SimTraffic were used to provide a statistical evaluation of the interaction between the intersections. The detailed LOS reports are provided in Appendix B. Hales Engineering also calculated the 95th percentile queue lengths for the study intersections using SimTraffic. The detailed queue length reports are provided in Appendix D.

D. Level of Service Standards

For the purposes of this study, a minimum acceptable intersection performance for each of the study intersections was set at LOS D. If levels of service E or F conditions exist, an explanation and/or mitigation measures will be presented. A LOS D threshold is consistent with "state-of-the-practice" traffic engineering principles for urbanized areas.

Table 1: Level of Service Description

LOS		Description of Traffic Conditions	Average Delay (seconds/vehicle)	
			Signalized Intersections	Unsignalized Intersections
A		Free Flow / Insignificant Delay	≤ 10	≤ 10
B		Stable Operations / Minimum Delays	> 10 to 20	> 10 to 15
C		Stable Operations / Acceptable Delays	> 20 to 35	> 15 to 25
D		Approaching Unstable Flows / Tolerable Delays	> 35 to 55	> 25 to 35
E		Unstable Operations / Significant Delays	> 55 to 80	> 35 to 50
F		Forced Flows / Unpredictable Flows / Excessive Delays	> 80	> 50

Source: Hales Engineering Descriptions, based on the *Highway Capacity Manual* (HCM), 6th Edition, 2016 Methodology (Transportation Research Board)

II. EXISTING (2021) BACKGROUND CONDITIONS

A. Purpose

The purpose of the background analysis is to study the intersections and roadways during the peak travel periods of the day with background traffic and geometric conditions. Through this analysis, background traffic operational deficiencies can be identified, and potential mitigation measures recommended. This analysis provides a baseline condition that may be compared to the build conditions to identify the impacts of the development.

B. Roadway System

The primary roadways that will provide access to the project site are described below:

Main Street (S.R. 36) – is a state-maintained roadway (classified by UDOT access management standards as a "Regional – Rural Importance" facility, or access category 4 roadway). S.R. 36 has one travel lane in each direction with left-turn lanes at intersections. North- and southbound traffic are separated by a two-way left-turn lane along most of the frontage of the project property. As identified and controlled by UDOT, a "Regional – Rural Importance" access classification identifies minimum signalized intersection spacing of one-half mile (2,640 feet), minimum unsignalized street spacing of 660 feet, and minimum driveway spacing of 500 feet. The posted speed limit on S.R. 36 varies between 35 and 55 mph in the project area.

Settlement Canyon Road – is a city-maintained roadway which is classified by the Tooele City Transportation Master Plan (February 2021) as a "local street." The roadway has one travel lanes in each direction. The posted speed limit is 25 mph in the study area.

900 South – is a city-maintained roadway which is classified by the Tooele City Transportation Master Plan (February 2021) as a "minor collector." The roadway has one travel lanes in each direction. The posted speed limit is 25 mph in the study area.

3 O'clock Drive – is a city-maintained roadway which is classified by the Tooele City Transportation Master Plan (February 2021) as a "local street." The roadway has one travel lanes in each direction. The posted speed limit is 25 mph in the study area.

C. Traffic Volumes

Weekday morning (7:00 to 9:00 a.m.) and evening (4:00 to 6:00 p.m.) peak period traffic counts were performed at the following intersections:

- Settlement Canyon Road / Main Street (S.R. 36)
- 900 South / Main Street (S.R. 36)
- Tooele School Bus Depot Access / Main Street (S.R. 36)
- Coleman Street / Main Street (S.R. 36)
- 3 O'clock Drive / Main Street (S.R. 36)

The counts were performed on Tuesday, October 5, 2021. The morning peak hour was determined to be between 8:00 and 9:00 a.m., and the evening peak hour was determined to be between 4:45 and 5:45 p.m. The evening peak hour volumes were approximately 65% higher than the morning peak hour volumes. Therefore, the evening peak hour volumes were used in the analysis to represent the worst-case conditions. Detailed count data are included in Appendix A.

Hales Engineering considered seasonal adjustments to the observed traffic volumes. Monthly traffic volume data were obtained from a nearby UDOT automatic traffic recorder (ATR) on I-80 (ATR #615). In recent years, traffic volumes in October have been equal to approximately 102% of average traffic volumes. The observed traffic volumes were therefore left unadjusted to remain conservative in this analysis.

The traffic counts were collected during the COVID-19 pandemic when traffic volumes may have been slightly reduced due to social distancing measures. According to the UDOT Automatic Traffic Signal Performance Measures (ATSPM) website, the traffic volumes on October 5, 2021, were 8% higher than traffic volumes on March 3, 2020 (Pre-COVID). Therefore, the collected data were not adjusted since volumes were found to be higher than in pre-COVID conditions.

Figure 2 shows the existing evening peak hour volumes as well as intersection geometry at the study intersections.

D. Level of Service Analysis

Hales Engineering determined that all study intersections are currently operating at acceptable levels of service during the evening peak hour, as shown in Table 2. These results serve as a baseline condition for the impact analysis of the proposed development during existing (2021) conditions.

E. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queueing was observed during the evening peak hour.

F. Mitigation Measures

No mitigation measures are recommended.

Tooele - One O'clock Hill TIS
Existing (2021) Background

Evening Peak Hour
Figure 2

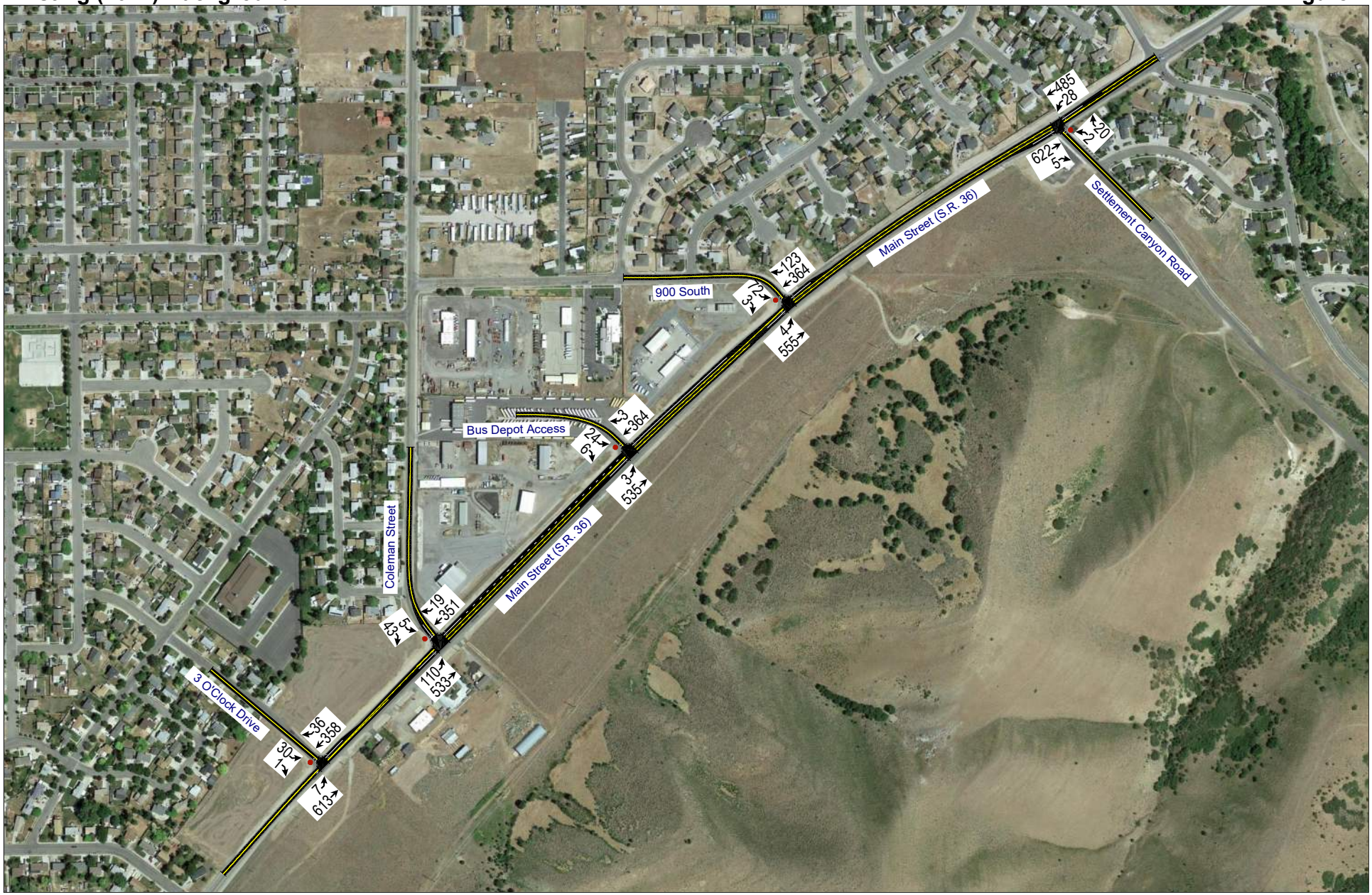

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Table 2: Existing (2021) Background Evening Peak Hour LOS

Intersection		Level of Service		
Description	Control	Movement[1]	Aver. Delay (Sec. / Veh.)	LOS[2]
Settlement Canyon Road / Main Street (S.R. 36)	NW Stop	NWL	11.1	b
900 South / Main Street (S.R. 36)	SE Stop	SEL	11.9	b
Bus Depot Access / Main Street (S.R. 36)	SE Stop	SEL	11.5	b
Coleman Street / Main Street (S.R. 36)	SE Stop	SEL	15.5	c
3 O'clock Drive / Main Street (S.R. 36)	SE Stop	SEL	11.1	b

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for all other unsignalized intersections.

Source: Hales Engineering, October 2021

III. PROJECT CONDITIONS

A. Purpose

The project conditions discussion explains the type and intensity of development. This provides the basis for trip generation, distribution, and assignment of project trips to the surrounding study intersections defined in Chapter I.

B. Project Description

The proposed One O'clock Hill development is located on the southeast side of Main Street (S.R. 36), between Settlement Canyon Road and 1220 South. The development will consist of single-family residential units. A concept plan for the proposed development is provided in Appendix C. The proposed land use for the development has been identified in Table 3.

Table 3: Project Land Uses

Land Use	Intensity
Single-family detached housing	105 Units

C. Trip Generation

Trip generation for the development was calculated using trip generation rates published in the Institute of Transportation Engineers (ITE), *Trip Generation*, 11th Edition, 2021. Trip generation for the proposed project is included in Table 4.

The total trip generation for the development is as follows:

- Daily Trips: 1,056
- Morning Peak Hour Trips: 78
- Evening Peak Hour Trips: 105

Table 4: Trip Generation

Trip Generation Tooele - One O'Clock Hill TIS								
Weekday Daily Land Use[1]	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	**Total New Daily Trips**
Single-Family Detached Housing (210)	105	Dwelling Units	1,056	50%	50%	528	528	**1,056**
Total			**1,056**			**528**	**528**	**1,056**
Morning Peak Hour Land Use[1]	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	**Total New AM Trips**
Single-Family Detached Housing (210)	105	Dwelling Units	78	26%	74%	20	58	**78**
Total			**78**			**20**	**58**	**78**
Evening Peak Hour Land Use[1]	# of Units	Unit Type	Trip Generation	% Entering	% Exiting	Trips Entering	Trips Exiting	**Total New PM Trips**
Single-Family Detached Housing (210)	105	Dwelling Units	105	63%	37%	66	39	**105**
Total			**105**			**66**	**39**	**105**

1. Land Use Code from the Institute of Transportation Engineers (ITE) *Trip Generation*, 11th Edition, 2021.

SOURCE: Hales Engineering, October 2021

D. Trip Distribution and Assignment

Project traffic is assigned to the roadway network based on the type of trip and the proximity of project access points to major streets, high population densities, and regional trip attractions. Existing travel patterns observed during data collection also provide helpful guidance to establishing these distribution percentages, especially near the site. The resulting distribution of project generated trips during the evening peak hour is shown in Table 5.

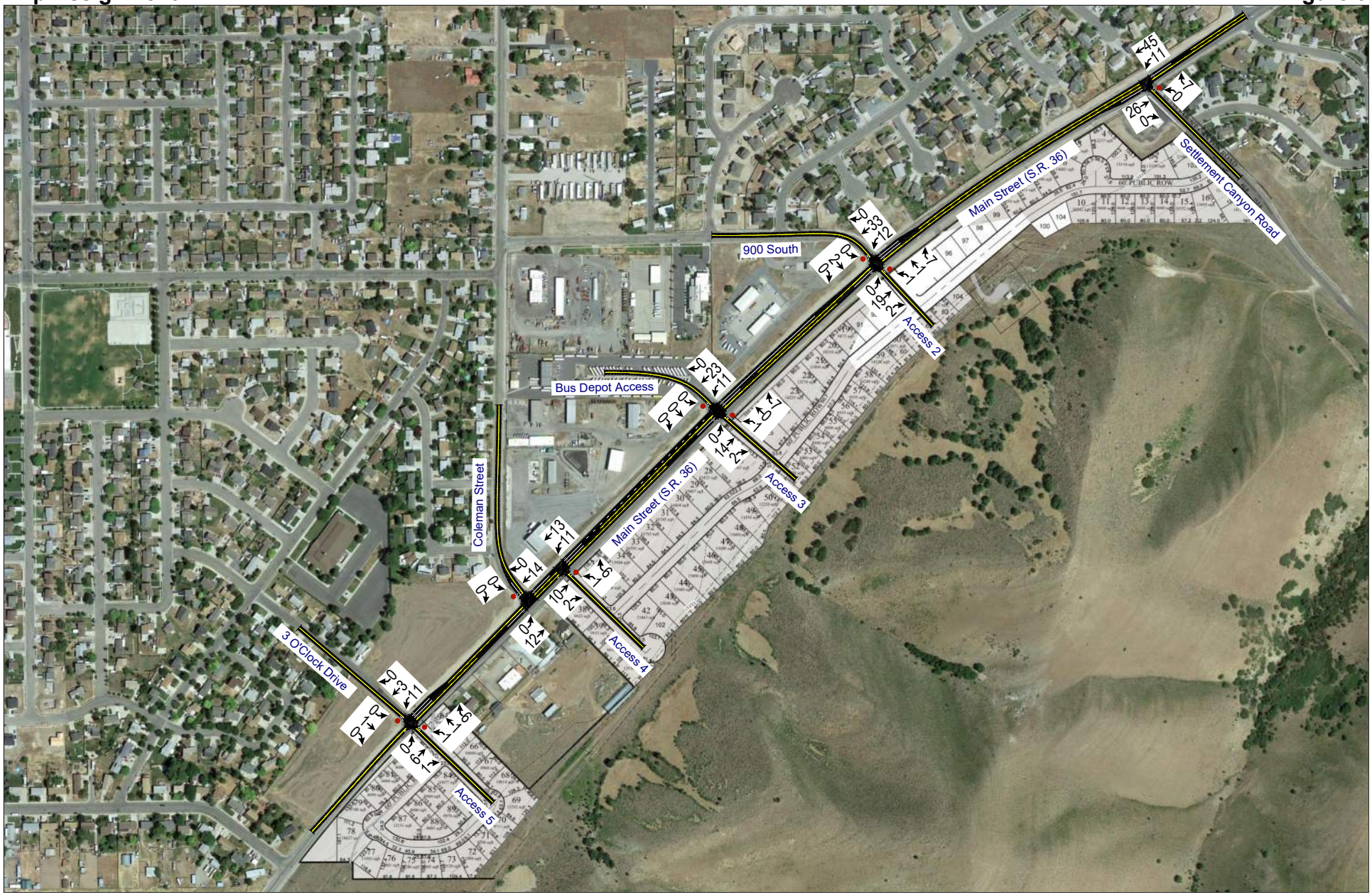
Table 5: Trip Distribution

Direction	% To/From Project
North	85%
South	10%
West	5%

These trip distribution assumptions were used to assign the evening peak hour generated traffic at the study intersections to create trip assignment for the proposed development. Trip assignment for the development is shown in Figure 3.

Tooele - One O'clock Hill TIS
Trip Assignment

Evening Peak Hour
Figure 3



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E. Access

The proposed access for the site will be gained at the following locations (see also concept plan in Appendix C):

Settlement Canyon Road:

- Access 1 will be located approximately 400 feet southeast of the Settlement Canyon Road / S.R. 36 intersection. It will access the project on the southwest side of Settlement Canyon Road. It is anticipated that the access will be stop-controlled.

Main Street (S.R. 36):

- Access 2 will be located at the existing 900 South / S.R. 36 intersection. It will access the project on the southeast side of S.R. 36. It is anticipated that the access will be stop-controlled.
- Access 3 will be located at the existing Tooele School Bus Depot Access / S.R. 36 intersection. It will access the project on the southeast side of S.R. 36. It is anticipated that the access will be stop-controlled.
- Access 4 will be located approximately 200 feet northeast of the Coleman Street / S.R. 36 intersection. It will access the project on the southeast side of S.R. 36. It is anticipated that the access will be stop-controlled.
- Access 5 will be located at the existing 3 O'clock Drive / S.R. 36 intersection. It will access the project on the southeast side of S.R. 36. It is anticipated that the access will be stop-controlled.

F. Auxiliary Lane Requirements

UDOT Administrative Rule R930-6 outlines minimum turn volumes (measured in vehicles per hour) to warrant auxiliary lanes. It is anticipated that auxiliary lanes may be required for the project accesses, as shown in Table 6.

Table 6: Auxiliary Lane Summary – Accesses onto S.R. 36 (UDOT AC 4)

Auxiliary Lane Type		Minimum Requirement	Measure	Met?
Left turn	Deceleration	10 vph	≥ 11 vph	Yes, all project accesses
	Acceleration	Safety Benefit?	No	No
Right turn	Deceleration	25 vph	≤ 2 vph	No
	Acceleration	50 vph	≤ 7 vph	No

It is anticipated that left-turn deceleration lanes may be required at all project accesses. This is currently possible for Access 1 – 4 due to the existing two-way left-turn lane (TWLTL) at these intersections. However, S.R. 36 may need to be widened at the 3 O'clock Drive & Access 5 / Main Street (S.R. 36) intersection to create a left-turn pocket, if required.

IV. EXISTING (2021) PLUS PROJECT CONDITIONS

A. Purpose

The purpose of the existing (2021) plus project analysis is to study the intersections and roadways during the peak travel periods of the day for existing background traffic and geometric conditions plus the net trips generated by the proposed development. This scenario provides valuable insight into the potential impacts of the proposed project on background traffic conditions.

B. Traffic Volumes

Hales Engineering added the project trips discussed in Chapter III to the existing (2021) background traffic volumes to predict turning movement volumes for existing (2021) plus project conditions. Existing (2021) plus project evening peak hour turning movement volumes are shown in Figure 4.

C. Level of Service Analysis

Hales Engineering determined that all intersections are anticipated to operate at acceptable levels of service during the evening peak hour with project traffic added, as shown in Table 7.

D. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queueing is anticipated during the evening peak hour.

E. Mitigation Measures

No mitigation measures are recommended.

Tooele - One O'clock Hill TIS
Existing (2021) Plus Project

Evening Peak Hour
Figure 4

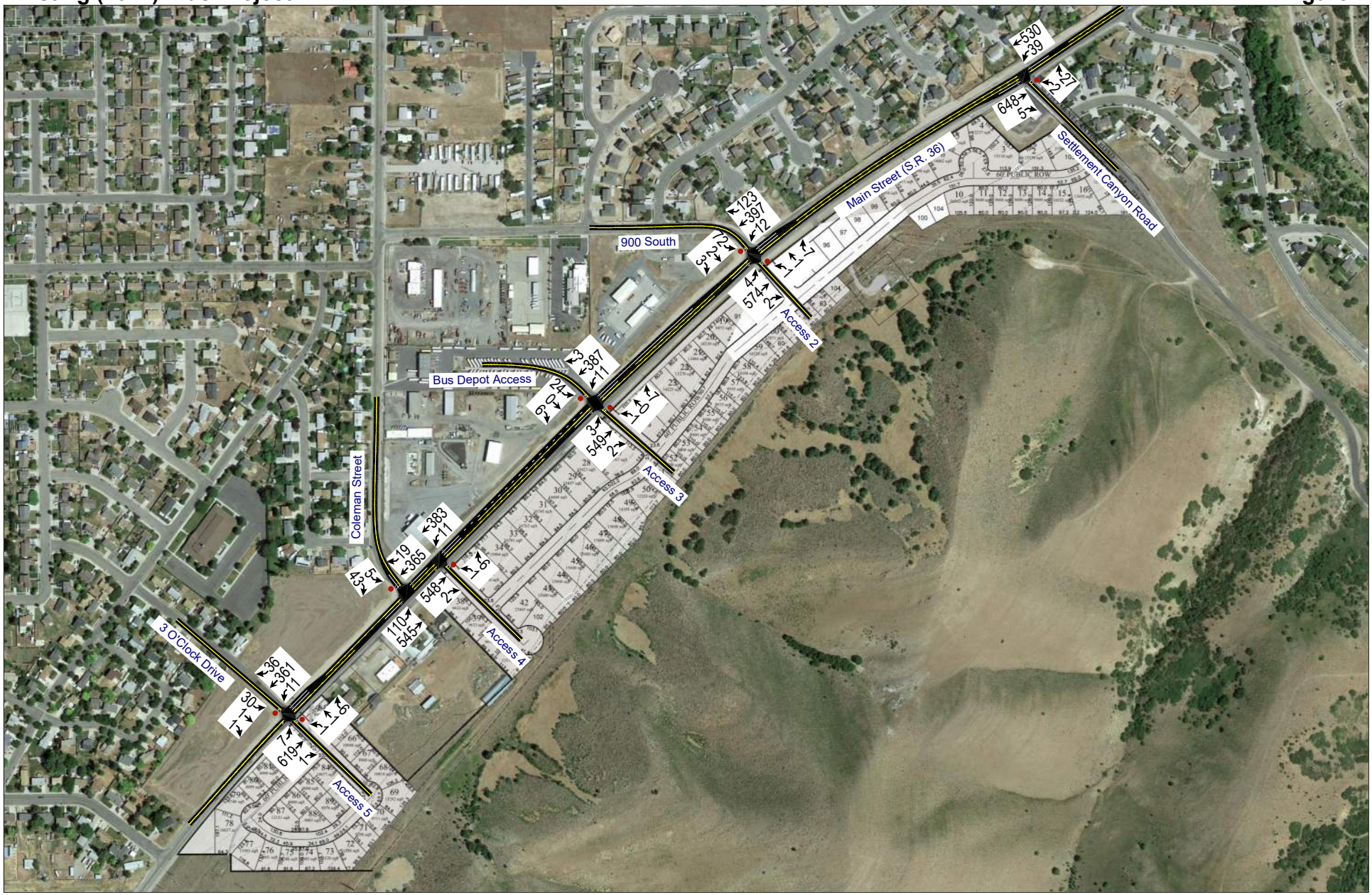

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Table 7: Existing (2021) Plus Project Evening Peak Hour LOS

Intersection		Level of Service		
Description	Control	Movement[1]	Aver. Delay (Sec. / Veh.)	LOS[2]
Settlement Canyon Road / Main Street (S.R. 36)	NW Stop	NWL	13.9	b
900 South & Access 2 / Main Street (S.R. 36)	NW/SE Stop	SEL	14.9	b
Bus Depot Access & Access 3 / Main Street (S.R. 36)	NW/SE Stop	SEL	13.1	b
Coleman Street / Main Street (S.R. 36)	SE Stop	SEL	15.1	c
3 O'clock Drive (Access 5) / Main Street (S.R. 36)	NW/SE Stop	NWT	15.2	c
Access 4 / Main Street (S.R. 36)	NW Stop	NWR	4.6	a

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for all other unsignalized intersections.

Source: Hales Engineering, October 2021

V. FUTURE (2026) BACKGROUND CONDITIONS

A. Purpose

The purpose of the future (2026) background analysis is to study the intersections and roadways during the peak travel periods of the day for future background traffic and geometric conditions. Through this analysis, future background traffic operational deficiencies can be identified, and potential mitigation measures recommended.

B. Roadway Network

According to the Wasatch Front Regional Council (WFRC) Regional Transportation Plan, there are no projects planned before 2026 in the study area. Therefore, no changes were made to the roadway network for the future (2026) analysis.

C. Traffic Volumes

Hales Engineering estimated future (2026) volumes using historical AADT data on S.R. 36. From 2013 to 2019, traffic volumes increased by approximately 18.2%. This equates to an annual growth rate of 2.4% per year. Hales Engineering assumed this growth from 2021 to 2026 to estimate future background volumes. Future (2026) evening peak hour turning movement volumes are shown in Figure 5.

D. Level of Service Analysis

Hales Engineering determined that all study intersections are anticipated to operate at acceptable levels of service during the evening peak hour in future (2026) background conditions, as shown in Table 8. These results serve as a baseline condition for the impact analysis of the proposed development for future (2026) conditions.

E. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queueing is anticipated during the evening peak hour.

F. Mitigation Measures

No mitigation measures are recommended.

Tooele - One O'clock Hill TIS
Future (2026) Background

Evening Peak Hour
Figure 5

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Table 8: Future (2026) Background Evening Peak Hour LOS

Intersection		Level of Service		
Description	Control	Movement[1]	Aver. Delay (Sec. / Veh.)	LOS[2]
Settlement Canyon Road / Main Street (S.R. 36)	NW Stop	NWL	14.8	b
900 South / Main Street (S.R. 36)	SE Stop	SEL	16.3	c
Bus Depot Access / Main Street (S.R. 36)	SE Stop	SEL	17.7	c
Coleman Street / Main Street (S.R. 36)	SE Stop	SEL	16.3	c
3 O'clock Drive / Main Street (S.R. 36)	SE Stop	SEL	14.9	b

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for all other unsignalized intersections.

Source: Hales Engineering, October 2021

VI. FUTURE (2026) PLUS PROJECT CONDITIONS

A. Purpose

The purpose of the future (2026) plus project analysis is to study the intersections and roadways during the peak travel periods of the day for future background traffic and geometric conditions plus the net trips generated by the proposed development. This scenario provides valuable insight into the potential impacts of the proposed project on future background traffic conditions.

B. Traffic Volumes

Hales Engineering added the project trips discussed in Chapter III to the future (2026) background traffic volumes to predict turning movement volumes for future (2026) plus project conditions. Future (2026) plus project evening peak hour turning movement volumes are shown in Figure 6.

C. Level of Service Analysis

Hales Engineering determined that all intersections are anticipated to operate at acceptable levels of service during the evening peak hour in future (2026) plus project conditions, as shown in Table 9.

D. Queuing Analysis

Hales Engineering calculated the 95th percentile queue lengths for each of the study intersections. No significant queueing is anticipated during the evening peak hour.

E. Mitigation Measures

No mitigation measures are recommended.

F. Recommended Storage Lengths

Hales Engineering determined recommended storage lengths based on the 95th percentile queue lengths given in the future (2026) plus project scenario. These storage lengths do not include the taper length. Recommended storage lengths for the study intersections are shown in Table 10. Intersections shown in Table 10 include new intersections and existing intersections that have recommended storage length changes.

Tooele - One O'clock Hill TIS
Future (2026) Plus Project

Evening Peak Hour
Figure 6

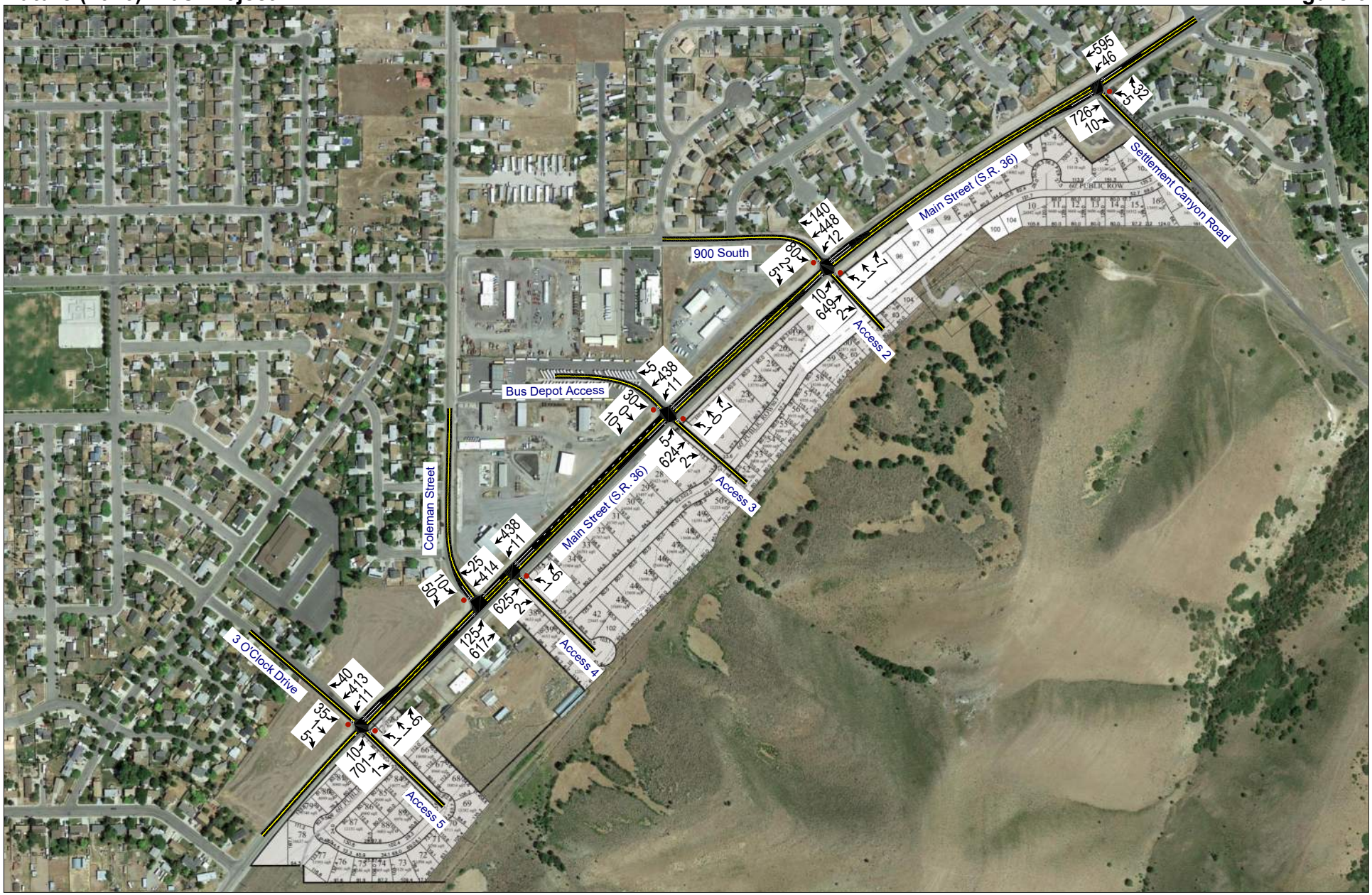

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Table 9: Future (2026) Plus Project Evening Peak Hour LOS

Intersection		Level of Service		
Description	Control	Movement[1]	Aver. Delay (Sec. / Veh.)	LOS[2]
Settlement Canyon Road / Main Street (S.R. 36)	NW Stop	NWL	26.3	d
900 South & Access 2 / Main Street (S.R. 36)	NW/SE Stop	SEL	21.2	c
Bus Depot Access & Access 3 / Main Street (S.R. 36)	NW/SE Stop	SEL	17.0	c
Coleman Street / Main Street (S.R. 36)	SE Stop	SEL	16.5	c
3 O'clock Drive (Access 5) / Main Street (S.R. 36)	NW/SE Stop	NWT	19.2	c
Access 4 / Main Street (S.R. 36)	NW Stop	NWR	5.8	a

1. Movement indicated for unsignalized intersections where delay and LOS represents worst movement. SBL = Southbound left movement, etc.
2. Uppercase LOS used for signalized, roundabout, and AWSC intersections. Lowercase LOS used for all other unsignalized intersections.

Source: Hales Engineering, October 2021

Table 10: Recommended Storage Lengths

	Intersection	Recommended Storage Lengths (feet)															
		NB (S.R. 36)				SB (S.R. 36)				EB				WB			
		LT		RT		LT		RT		LT		RT		LT		RT	
		E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
1	Settlement Canyon Road / Main Street (S.R. 36)	-	-	100	-	-	**100**	-	-	-	-	-	-	-	-	-	-
2	900 South & Access 2 / Main Street (S.R. 36)	100	-	-	-	100	**100**	-	-	-	-	-	-	-	-	-	-
3	Bus Depot Access & Access 3 / Main Street (S.R. 36)	100	-	-	-	-	**100**	530	-	-	-	-	-	-	-	-	-
4	Coleman Street / Main Street (S.R. 36)	100	-	-	-	-	-	100	-	-	-	60	**75**	-	-	-	-
5	3 O'clock Drive & Access 5 / Main Street (S.R. 36)	-	-	-	-	-	**100**	100	-	-	-	-	-	-	-	-	-
6	Access 4 / Main Street (S.R. 36)	-	-	-	-	-	**100**	-	-	-	-	-	-	-	-	-	-

1. Storage lengths are based on 2026 95th percentile queue lengths and do not include required deceleration / taper distances
2. E = Existing storage length (approximate), if applicable; P = proposed storage length for new turn lanes or changes to existing turn lanes, if applicable

Source: Hales Engineering, October 2021

APPENDIX A

Turning Movement Counts

TrafficCounts

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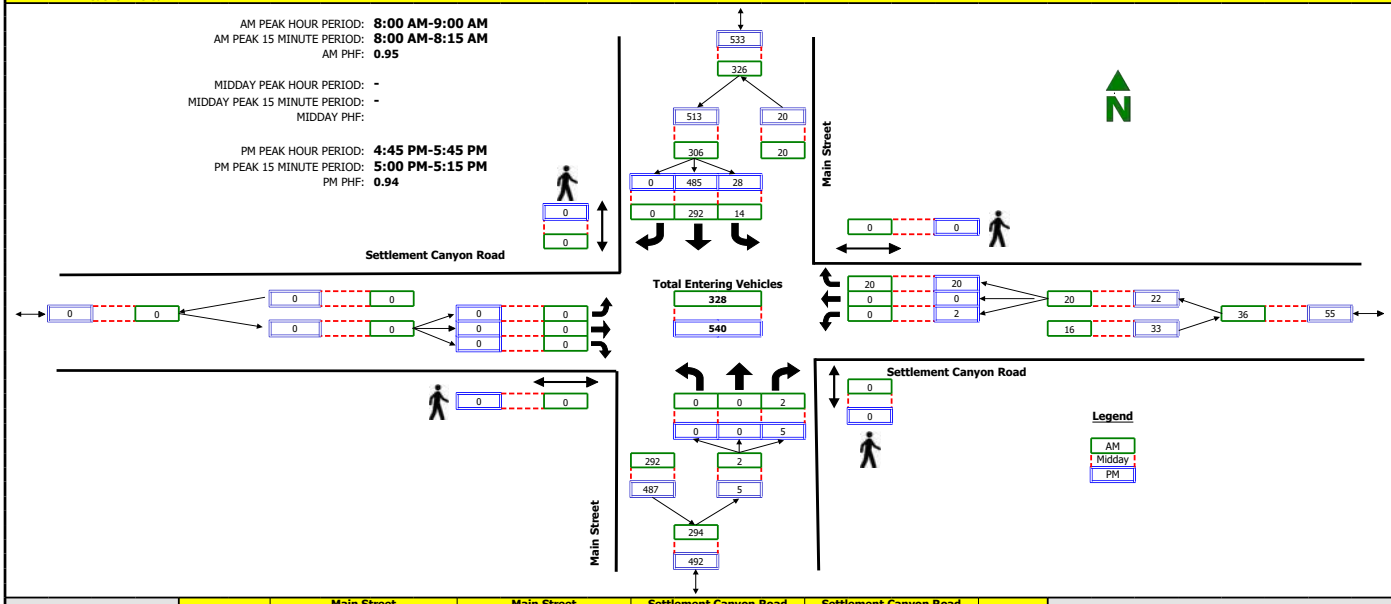
Intersection Turning Movement Summary

Intersection:	**Main Street / Settlement Canyon Road**	**Date:**	**10-5-21, Tue**
North/South:	**Main Street**	**Day of Week Adjustment:**	**100.0%**
East/West:	**Settlement Canyon Road**	**Month of Year Adjustment:**	**100.0%** 102.4
Jurisdiction:	**Tooele**	**Adjustment Station #:**	**615**
Project Title:	**One O'Clock Hill TIS**	**Growth Rate:**	**0.0%**
Project No:	**UT21-2019**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD: **8:00 AM-9:00 AM**
AM PEAK 15 MINUTE PERIOD: **8:00 AM-8:15 AM**
AM PHF: **0.95**

MIDDAY PEAK HOUR PERIOD: **-**
MIDDAY PEAK 15 MINUTE PERIOD: **-**
MIDDAY PHF:

PM PEAK HOUR PERIOD: **4:45 PM-5:45 PM**
PM PEAK 15 MINUTE PERIOD: **5:00 PM-5:15 PM**
PM PHF: **0.94**



RAW COUNT SUMMARIES	Main Street Northbound				Main Street Southbound				Settlement Canyon Road Eastbound				Settlement Canyon Road Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00 - 7:15	0	0	0	0	0	52	0	0	0	0	0	0	0	0	6	0	58
7:15 - 7:30	0	0	1	0	0	44	0	0	0	0	0	0	0	0	2	0	47
7:30 - 7:45	0	0	2	0	3	49	0	0	0	0	0	0	0	0	5	0	59
7:45 - 8:00	0	0	0	0	5	58	0	0	0	0	0	0	1	0	2	0	66
8:00 - 8:15	0	0	1	0	3	76	0	0	0	0	0	0	0	0	6	0	86
8:15 - 8:30	0	0	1	0	4	75	0	0	0	0	0	0	0	0	5	0	85
8:30 - 8:45	0	0	0	0	4	71	0	0	0	0	0	0	0	0	3	0	78
8:45 - 9:00	0	0	0	0	3	70	0	0	0	0	0	0	0	0	6	0	79

MIDDAY PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00 - 16:15	0	0	0	0	2	115	0	0	0	0	0	0	1	0	4	0	122
16:15 - 16:30	0	0	1	0	9	103	0	0	0	0	0	0	1	0	11	0	125
16:30 - 16:45	0	0	2	0	2	124	0	0	0	0	0	0	1	0	7	0	136
16:45 - 17:00	0	0	1	0	4	116	0	0	0	0	0	0	1	0	6	0	128
17:00 - 17:15	0	0	1	0	5	135	0	0	0	0	0	0	0	0	3	0	144
17:15 - 17:30	0	0	1	0	7	112	0	0	0	0	0	0	0	0	4	0	124
17:30 - 17:45	0	0	2	0	12	122	0	0	0	0	0	0	1	0	7	0	144
17:45 - 18:00	0	0	2	0	2	107	0	0	0	0	0	0	0	0	2	0	113

TrafficCounts

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Lehi, UT 84043
801.636.0891

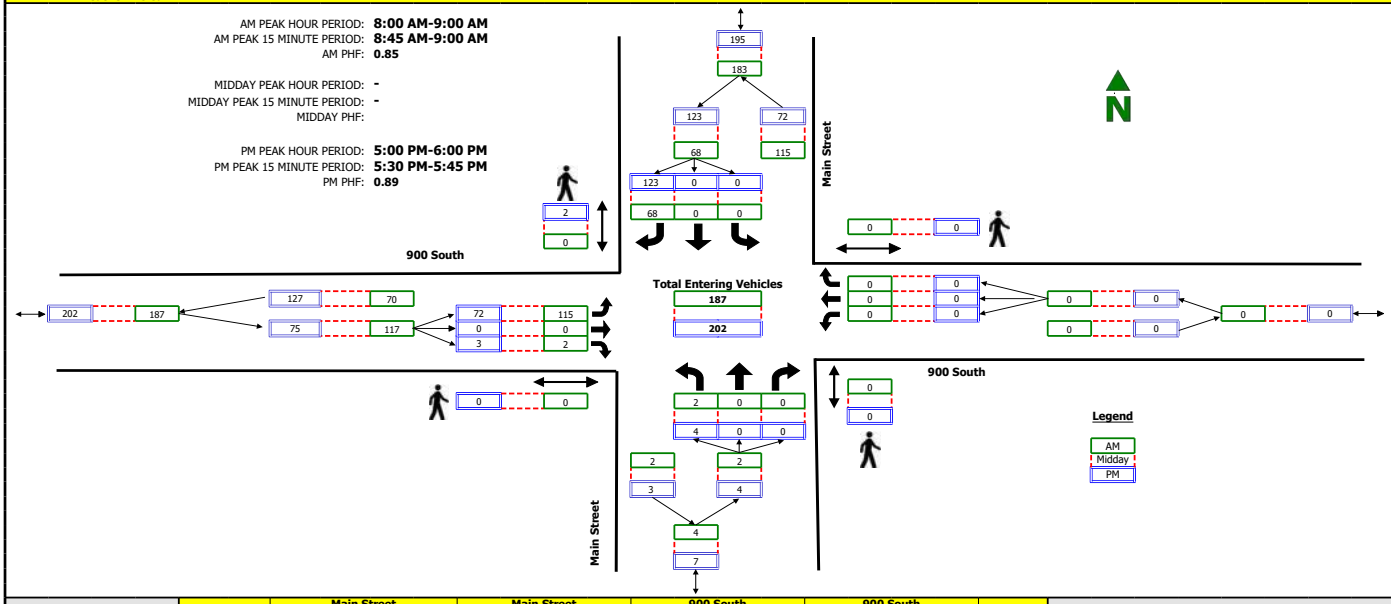
Intersection Turning Movement Summary

Intersection:	**Main Street / 900 South**	**Date:**	**10-5-21, Tue**
North/South:	**Main Street**	**Day of Week Adjustment:**	**100.0%**
East/West:	**900 South**	**Month of Year Adjustment:**	**100.0%**
Jurisdiction:	**Tooele**	**Adjustment Station #:**	**0**
Project Title:	**One O'Clock Hill TIS**	**Growth Rate:**	**0.0%**
Project No:	**UT21-2019**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD: **8:00 AM-9:00 AM**
AM PEAK 15 MINUTE PERIOD: **8:45 AM-9:00 AM**
AM PHF: **0.85**

MIDDAY PEAK HOUR PERIOD: **-**
MIDDAY PEAK 15 MINUTE PERIOD: **-**
MIDDAY PHF:

PM PEAK HOUR PERIOD: **5:00 PM-6:00 PM**
PM PEAK 15 MINUTE PERIOD: **5:30 PM-5:45 PM**
PM PHF: **0.89**



RAW COUNT SUMMARIES	Main Street Northbound				Main Street Southbound				900 South Eastbound				900 South Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	
AM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
7:00 - 7:15	0	0	0	0	0	0	7	0	14	1	0	0	0	0	0	0	22
7:15 - 7:30	0	0	0	0	0	0	5	0	19	0	1	0	0	0	0	0	25
7:30 - 7:45	1	0	0	0	0	0	3	0	23	0	1	0	0	0	0	0	28
7:45 - 8:00	1	0	0	0	0	0	18	0	22	0	4	0	0	0	0	0	45
8:00 - 8:15	1	0	0	0	0	0	20	0	28	0	1	0	0	0	0	0	50
8:15 - 8:30	0	0	0	0	0	0	16	0	19	0	0	0	0	0	0	0	35
8:30 - 8:45	1	0	0	0	0	0	22	0	24	0	0	0	0	0	0	0	47
8:45 - 9:00	0	0	0	0	0	0	10	0	44	0	1	0	0	0	0	0	55
MIDDAY PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM PERIOD COUNTS																	
Period	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**TOTAL**
16:00 - 16:15	0	0	0	0	0	0	26	0	20	0	0	0	0	0	0	0	46
16:15 - 16:30	0	0	0	0	0	0	23	0	17	0	0	0	0	0	0	0	40
16:30 - 16:45	1	0	0	0	0	0	32	0	19	0	1	0	0	0	0	0	53
16:45 - 17:00	1	0	0	0	0	0	20	0	22	1	3	0	0	0	0	0	47
17:00 - 17:15	1	0	0	0	0	0	36	0	14	0	1	0	0	0	0	0	52
17:15 - 17:30	0	0	0	0	0	0	21	0	18	0	1	0	0	0	0	0	40
17:30 - 17:45	3	0	0	0	0	0	32	1	21	0	1	0	0	0	0	0	57
17:45 - 18:00	0	0	0	0	0	0	34	1	19	0	0	0	0	0	0	0	53

TrafficCounts

2364 North 1450 East
Lehi, UT 84043
801.636.0891

Intersection Turning Movement Summary

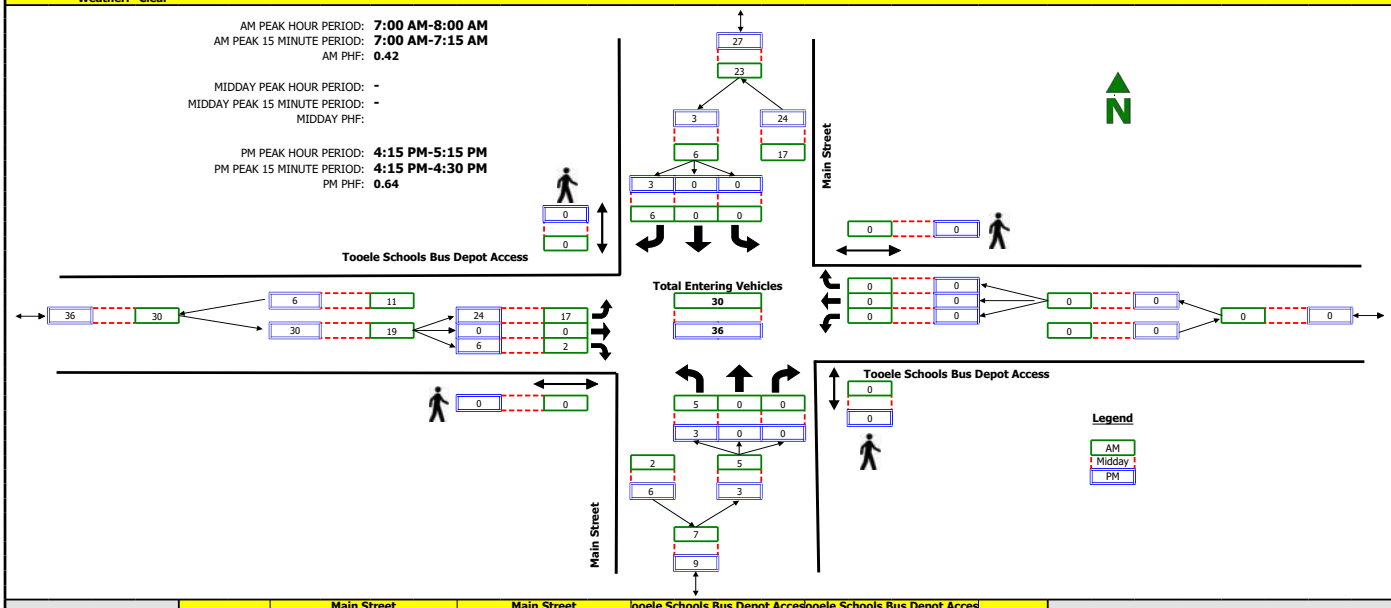
Intersection: Main Street / Tooele Schools Bus Depot Access
North/South: Main Street
East/West: Tooele Schools Bus Depot Access
Jurisdiction: Tooele
Project Title: One O'Clock Hill TIS
Project No: UT21-2019
Weather: Clear

Date: 10-5-21, Tue
Day of Week Adjustment: 100.0%
Month of Year Adjustment: 100.0%
Adjustment Station #: 0
Growth Rate: 0.0%
Number of Years: 0

AM PEAK HOUR PERIOD: **7:00 AM-8:00 AM**
AM PEAK 15 MINUTE PERIOD: **7:00 AM-7:15 AM**
AM PHF: **0.42**

MIDDAY PEAK HOUR PERIOD: **-**
MIDDAY PEAK 15 MINUTE PERIOD: **-**
MIDDAY PHF:

PM PEAK HOUR PERIOD: **4:15 PM-5:15 PM**
PM PEAK 15 MINUTE PERIOD: **4:15 PM-4:30 PM**
PM PHF: **0.64**



RAW COUNT SUMMARIES	Main Street Northbound				Main Street Southbound				ooele Schools Bus Depot Acces Eastbound				ooele Schools Bus Depot Acces Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00 - 7:15	2	0	0	0	0	0	2	0	12	0	2	0	0	0	0	0	18
7:15 - 7:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:30 - 7:45	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
7:45 - 8:00	2	0	0	0	0	0	3	0	4	0	0	0	0	0	0	0	9
8:00 - 8:15	0	0	0	0	0	0	0	0	5	0	2	0	0	0	0	0	7
8:15 - 8:30	0	0	0	0	0	0	2	4	1	0	2	0	0	0	0	0	5
8:30 - 8:45	0	0	0	0	0	0	2	1	3	0	2	0	0	0	0	0	7
8:45 - 9:00	0	0	0	0	0	0	4	0	4	0	2	0	0	0	0	0	10

MIDDAY PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00 - 16:15	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	3
16:15 - 16:30	1	0	0	0	0	0	1	0	9	0	3	0	0	0	0	0	14
16:30 - 16:45	1	0	0	0	0	0	1	0	7	0	1	0	0	0	0	0	10
16:45 - 17:00	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	3
17:00 - 17:15	1	0	0	0	0	0	0	0	7	0	1	0	0	0	0	0	9
17:15 - 17:30	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
17:30 - 17:45	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
17:45 - 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TrafficCounts

2364 North 1450 East
Lehi, UT 84043
801.636.0891

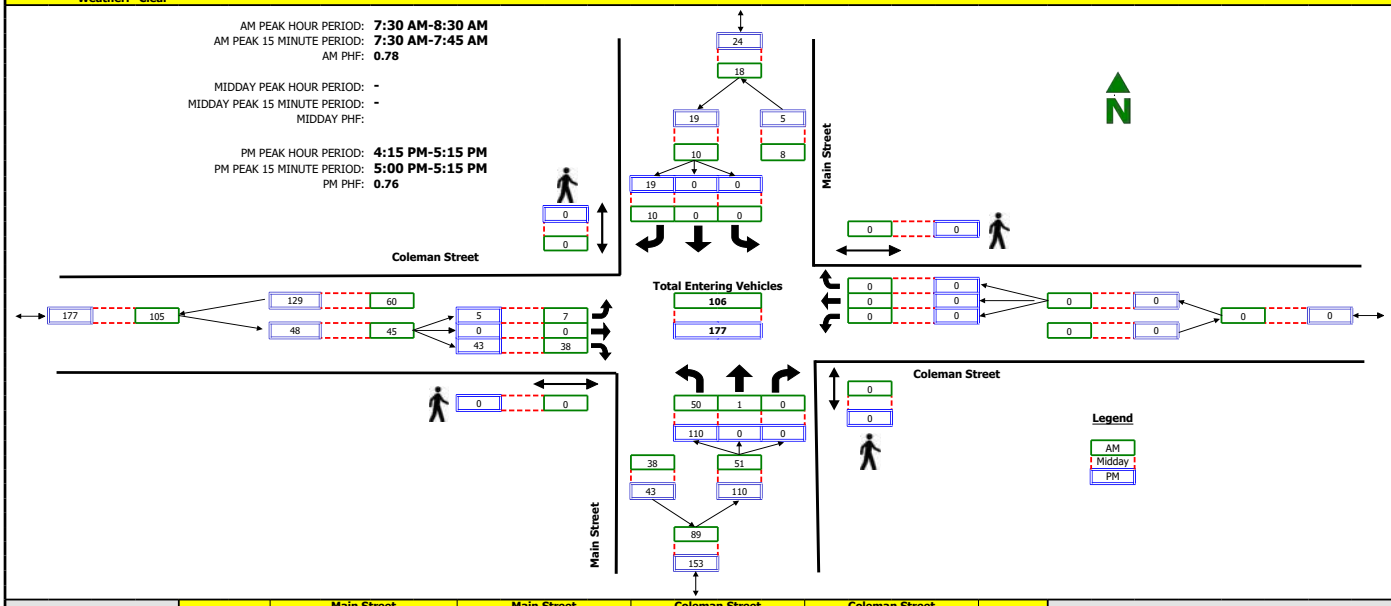
Intersection Turning Movement Summary

Intersection:	**Main Street / Coleman Street**	**Date:**	**10-5-21, Tue**
North/South:	**Main Street**	**Day of Week Adjustment:**	**100.0%**
East/West:	**Coleman Street**	**Month of Year Adjustment:**	**100.0%**
Jurisdiction:	**Tooele**	**Adjustment Station #:**	**0**
Project Title:	**One O'Clock Hill TIS**	**Growth Rate:**	**0.0%**
Project No:	**UT21-2019**	**Number of Years:**	**0**
Weather:	**Clear**		

AM PEAK HOUR PERIOD: **7:30 AM-8:30 AM**
AM PEAK 15 MINUTE PERIOD: **7:30 AM-7:45 AM**
AM PHF: **0.78**

MIDDAY PEAK HOUR PERIOD: **-**
MIDDAY PEAK 15 MINUTE PERIOD: **-**
MIDDAY PHF:

PM PEAK HOUR PERIOD: **4:15 PM-5:15 PM**
PM PEAK 15 MINUTE PERIOD: **5:00 PM-5:15 PM**
PM PHF: **0.76**



RAW COUNT SUMMARIES	Main Street Northbound				Main Street Southbound				Coleman Street Eastbound				Coleman Street Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00 - 7:15	6	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	11
7:15 - 7:30	8	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	10
7:30 - 7:45	16	0	0	0	0	0	1	0	3	0	14	0	0	0	0	0	34
7:45 - 8:00	16	0	0	0	0	0	4	0	1	0	11	0	0	0	0	0	32
8:00 - 8:15	11	1	0	0	0	0	2	0	2	0	6	0	0	0	0	0	22
8:15 - 8:30	7	0	0	0	0	0	3	0	1	0	7	0	0	0	0	0	18
8:30 - 8:45	14	0	0	0	0	0	3	0	4	0	7	0	0	0	0	0	28
8:45 - 9:00	10	0	0	0	0	0	7	0	3	0	4	0	0	0	0	0	24

MIDDAY PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00 - 16:15	12	0	0	0	0	0	6	0	1	0	13	0	0	0	0	0	32
16:15 - 16:30	19	0	0	0	0	0	8	0	0	0	9	0	0	0	0	0	36
16:30 - 16:45	24	0	0	0	0	0	7	0	2	0	12	0	0	0	0	0	45
16:45 - 17:00	28	0	0	0	0	0	1	0	0	0	9	0	0	0	0	0	38
17:00 - 17:15	39	0	0	0	0	0	3	0	3	0	13	0	0	0	0	0	58
17:15 - 17:30	14	0	0	0	0	0	2	0	3	0	10	0	0	0	0	0	29
17:30 - 17:45	9	0	0	0	0	0	5	0	1	0	6	0	0	0	0	0	21
17:45 - 18:00	15	0	0	0	0	0	4	0	1	0	14	0	0	0	0	0	34

TrafficCounts

2364 North 1450 East
Lehi, UT 84043
801.636.0891

Intersection Turning Movement Summary

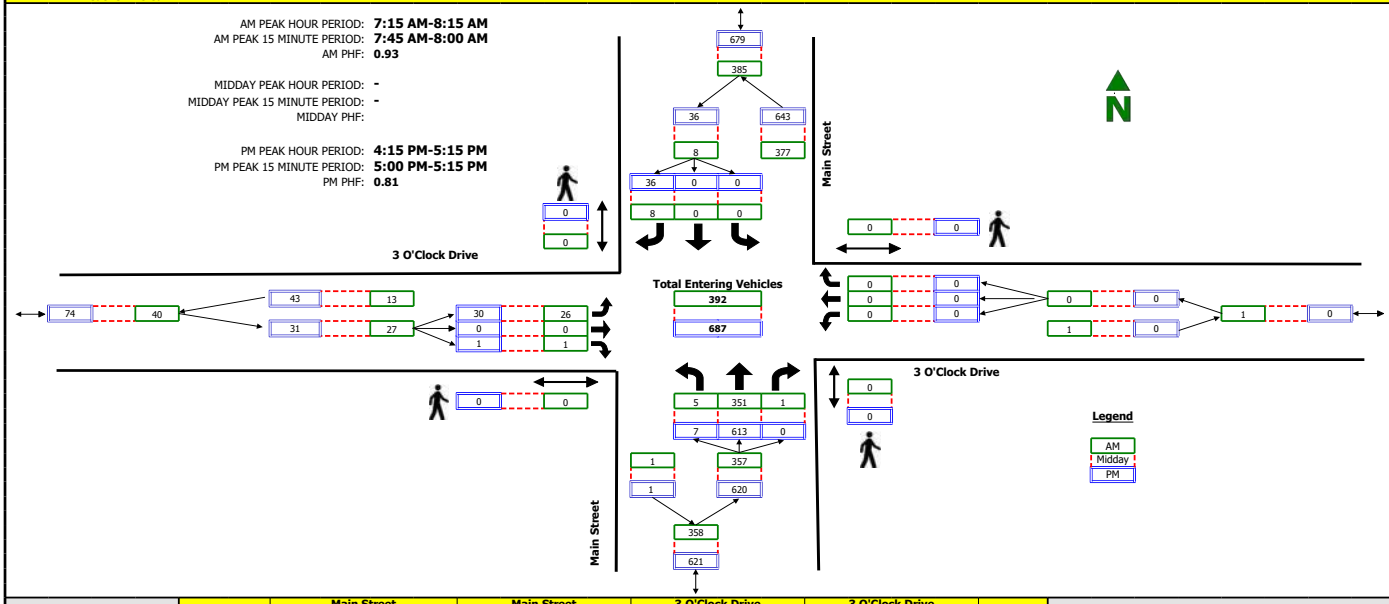
Intersection: Main Street / 3 O'Clock Drive
North/South: Main Street
East/West: 3 O'Clock Drive
Jurisdiction: Tooele
Project Title: One O'Clock Hill TIS
Project No: UT21-2019
Weather: Clear

Date: 10-5-21, Tue
Day of Week Adjustment: 100.0%
Month of Year Adjustment: 100.0%
Adjustment Station #: 0
Growth Rate: 0.0%
Number of Years: 0

AM PEAK HOUR PERIOD: **7:15 AM-8:15 AM**
AM PEAK 15 MINUTE PERIOD: **7:45 AM-8:00 AM**
AM PHF: **0.93**

MIDDAY PEAK HOUR PERIOD: **-**
MIDDAY PEAK 15 MINUTE PERIOD: **-**
MIDDAY PHF:

PM PEAK HOUR PERIOD: **4:15 PM-5:15 PM**
PM PEAK 15 MINUTE PERIOD: **5:00 PM-5:15 PM**
PM PHF: **0.81**



RAW COUNT SUMMARIES	Main Street Northbound				Main Street Southbound				3 O'Clock Drive Eastbound				3 O'Clock Drive Westbound				TOTAL
	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	

AM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
7:00 - 7:15	0	64	0	0	0	0	0	0	4	0	0	0	0	0	0	0	68
7:15 - 7:30	2	82	0	0	0	0	1	0	7	0	0	0	0	0	0	0	92
7:30 - 7:45	1	87	0	0	0	0	0	0	5	0	0	0	0	0	0	0	93
7:45 - 8:00	0	95	1	0	0	0	4	0	4	0	1	0	0	0	0	0	105
8:00 - 8:15	2	87	0	0	0	0	3	0	10	0	0	0	0	0	0	0	102
8:15 - 8:30	3	64	0	0	0	2	5	0	9	0	0	0	0	0	0	0	83
8:30 - 8:45	3	78	0	0	0	2	5	0	10	0	1	0	0	0	0	0	99
8:45 - 9:00	1	74	0	0	0	7	1	0	7	0	0	0	0	0	0	0	90

MIDDAY PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
9:00 - 9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 - 9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 - 9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 - 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PERIOD COUNTS

Period	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	TOTAL
16:00 - 16:15	4	78	0	0	0	0	3	0	1	0	3	0	0	0	0	0	89
16:15 - 16:30	1	121	0	0	0	0	10	0	11	0	0	0	0	0	0	0	143
16:30 - 16:45	0	116	0	0	0	0	8	0	6	0	0	0	0	0	0	0	130
16:45 - 17:00	3	183	0	0	0	0	10	0	5	0	1	0	0	0	0	0	202
17:00 - 17:15	3	193	0	0	0	0	8	0	8	0	0	0	0	0	0	0	212
17:15 - 17:30	0	85	0	0	0	0	13	0	3	0	0	0	0	0	0	0	101
17:30 - 17:45	1	103	0	0	0	0	6	0	3	0	0	0	0	0	0	0	113
17:45 - 18:00	1	112	0	0	0	0	13	0	5	0	0	0	0	0	0	0	131

APPENDIX B

LOS Results

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Existing (2021) Background*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Settlement Canyon Road & Main Street (S.R. 36)
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
EB	T	622	617	99	1.9	*A*
	R	5	6	114	1.0	*A*
	Subtotal	627	623	99	1.9	*A*
WB	L	28	28	100	5.2	*A*
	T	485	475	98	0.4	*A*
	Subtotal	513	503	98	0.7	*A*
NW	***L***	***2***	***2***	***100***	***11.1***	***B***
	R	20	22	111	5.6	*A*
	Subtotal	22	24	109	6.1	*A*
Total		1,162	1,150	99	1.4	*A*

Intersection: Main Street (S.R. 36) & 900 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***72***	***69***	***96***	***11.9***	***B***
	R	3	3	100	6.6	*A*
	Subtotal	75	72	96	11.7	*B*
NE	L	4	3	75	3.3	*A*
	T	556	554	100	0.9	*A*
	Subtotal	560	557	99	0.9	*A*
SW	T	365	355	97	1.2	*A*
	R	123	123	100	0.8	*A*
	Subtotal	488	478	98	1.1	*A*
Total		1,123	1,107	99	1.7	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Existing (2021) Background*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Bus Depot Access
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***24***	***26***	***108***	***11.5***	***B***
	R	6	8	128	2.7	*A*
	Subtotal	30	34	113	9.4	*A*
NE	L	3	3	100	1.5	*A*
	T	535	532	99	1.1	*A*
	Subtotal	538	535	99	1.1	*A*
SW	T	364	352	97	0.5	*A*
	R	3	4	133	0.1	*A*
	Subtotal	367	356	97	0.5	*A*
Total		936	925	99	1.2	*A*

Intersection: Main Street (S.R. 36) & Coleman Street
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***5***	***5***	***95***	***15.5***	***C***
	R	43	44	103	4.0	*A*
	Subtotal	48	49	102	5.2	*A*
NE	L	110	112	102	2.7	*A*
	T	534	531	99	0.8	*A*
	Subtotal	644	643	100	1.1	*A*
SW	T	352	342	97	1.2	*A*
	R	19	19	101	0.3	*A*
	Subtotal	371	361	97	1.2	*A*
Total		1,063	1,053	99	1.3	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: **Tooele - One O'clock Hill TIS**
Analysis Period: ***Existing (2021) Background***
Time Period: ***Evening Peak Hour*** **Project #:** ***UT21-2019***

Intersection: **Main Street (S.R. 36) & 3 O'Clock Drive**
Type: **Unsignalized**

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***30***	***28***	***93***	***11.1***	***B***
	R	1	2	200	2.8	*A*
	Subtotal	31	30	97	10.5	*B*
NE	L	7	6	83	1.3	*A*
	T	613	614	100	2.0	*A*
	Subtotal	620	620	100	2.0	*A*
SW	T	358	348	97	0.9	*A*
	R	36	37	102	0.2	*A*
	Subtotal	394	385	98	0.8	*A*
Total		1,046	1,035	99	1.8	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Existing (2021) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Settlement Canyon Road & Main Street (S.R. 36)
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
EB	T	649	665	103	2.0	*A*
	R	5	7	133	0.6	*A*
	Subtotal	654	672	103	2.0	*A*
WB	L	39	39	101	5.2	*A*
	T	530	537	101	0.4	*A*
	Subtotal	569	576	101	0.7	*A*
NW	***L***	***2***	***1***	***50***	***13.9***	***B***
	R	27	29	107	6.6	*A*
	Subtotal	29	30	103	6.8	*A*
Total		1,252	1,278	102	1.6	*A*

Intersection: Main Street (S.R. 36) & Access 2/900 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	T	1	1	100	6.0	*A*
	R	7	9	124	5.7	*A*
	Subtotal	9	10	111	5.7	*A*
SE	***L***	***72***	***72***	***100***	***14.9***	***B***
	T	2	1	50	14.1	*B*
	R	3	3	100	7.4	*A*
	Subtotal	77	76	99	14.6	*B*
NE	L	4	4	100	2.6	*A*
	T	574	589	103	1.0	*A*
	R	2	2	100	0.4	*A*
	Subtotal	580	595	103	1.0	*A*
SW	L	12	13	106	3.1	*A*
	T	398	395	99	1.3	*A*
	R	123	132	107	1.0	*A*
	Subtotal	533	540	101	1.3	*A*
Total		1,199	1,221	102	2.0	*A*

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Existing (2021) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Access 3/Bus Depot Access
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	1	100	5.0	*A*
	R	7	7	97	5.2	*A*
	Subtotal	8	8	100	5.2	*A*
SE	***L***	***24***	***25***	***104***	***13.1***	***B***
	R	6	6	96	3.6	*A*
	Subtotal	30	31	103	11.3	*B*
NE	L	3	3	100	1.5	*A*
	T	549	564	103	1.2	*A*
	R	2	3	150	0.1	*A*
	Subtotal	554	570	103	1.2	*A*
SW	L	11	10	89	2.4	*A*
	T	387	384	99	0.6	*A*
	R	3	4	133	0.1	*A*
	Subtotal	401	398	99	0.6	*A*
Total		994	1,007	101	1.3	*A*

Intersection: Main Street (S.R. 36) & Coleman Street
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***5***	***4***	***76***	***15.1***	***C***
	R	43	42	98	4.0	*A*
	Subtotal	48	46	96	5.0	*A*
NE	L	110	108	98	3.2	*A*
	T	546	564	103	1.0	*A*
	Subtotal	656	672	102	1.4	*A*
SW	T	365	357	98	0.3	*A*
	R	19	20	107	0.1	*A*
	Subtotal	384	377	98	0.3	*A*
Total		1,087	1,095	101	1.2	*A*

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Existing (2021) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Access 5/3 O'Clock Drive
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	1	100	9.8	*A*
	T	***1***	***1***	***100***	***15.2***	***C***
	R	6	6	96	6.8	*A*
	Subtotal	8	8	100	8.2	*A*
SE	L	30	32	106	11.7	*B*
	T	1	1	100	5.9	*A*
	R	1	1	100	1.8	*A*
	Subtotal	32	34	106	11.2	*B*
NE	L	7	7	97	1.8	*A*
	T	619	632	102	2.3	*A*
	R	1	2	200	0.0	*A*
	Subtotal	627	641	102	2.3	*A*
SW	L	11	9	80	2.9	*A*
	T	362	359	99	1.0	*A*
	R	36	32	88	0.2	*A*
	Subtotal	409	400	98	1.0	*A*
Total		1,077	1,083	101	2.1	*A*

Intersection: Main Street (S.R. 36) & Access 4
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	R	***6***	***6***	***96***	***4.6***	***A***
	Subtotal	7	6	86	4.6	*A*
NE	T	548	565	103	0.2	*A*
	R	2	2	100	0.0	*A*
	Subtotal	550	567	103	0.2	*A*
SW	L	11	12	107	2.4	*A*
	T	384	379	99	1.0	*A*
	Subtotal	395	391	99	1.0	*A*
Total		953	964	101	0.6	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Future (2026) Background*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Settlement Canyon Road & Main Street (S.R. 36)
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
EB	T	701	707	101	2.1	*A*
	R	10	11	107	1.1	*A*
	Subtotal	711	718	101	2.1	*A*
WB	L	35	33	94	5.8	*A*
	T	550	558	102	0.4	*A*
	Subtotal	585	591	101	0.7	*A*
NW	***L***	***5***	***5***	***95***	***14.8***	***B***
	R	25	23	92	6.6	*A*
	Subtotal	30	28	93	8.1	*A*
Total		1,326	1,337	101	1.6	*A*

Intersection: Main Street (S.R. 36) & 900 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***80***	***80***	***100***	***16.3***	***C***
	R	5	6	114	5.8	*A*
	Subtotal	85	86	101	15.6	*C*
NE	L	10	8	78	3.2	*A*
	T	630	640	102	1.0	*A*
	Subtotal	640	648	101	1.0	*A*
SW	T	416	420	101	1.4	*A*
	R	140	144	103	1.1	*A*
	Subtotal	556	564	101	1.3	*A*
Total		1,281	1,298	101	2.1	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Future (2026) Background*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Bus Depot Access
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***30***	***31***	***102***	***17.7***	***C***
	R	10	11	107	6.0	*A*
	Subtotal	40	42	105	14.6	*B*
NE	L	5	6	114	1.8	*A*
	T	611	617	101	1.3	*A*
	Subtotal	616	623	101	1.3	*A*
SW	T	415	419	101	0.6	*A*
	R	5	6	114	0.2	*A*
	Subtotal	420	425	101	0.6	*A*
Total		1,077	1,090	101	1.6	*A*

Intersection: Main Street (S.R. 36) & Coleman Street
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***10***	***9***	***88***	***16.3***	***C***
	R	50	49	98	4.9	*A*
	Subtotal	60	58	97	6.7	*A*
NE	L	125	120	96	3.3	*A*
	T	605	613	101	1.1	*A*
	Subtotal	730	733	100	1.5	*A*
SW	T	400	406	101	1.3	*A*
	R	25	25	100	0.3	*A*
	Subtotal	425	431	101	1.2	*A*
Total		1,216	1,222	101	1.6	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: **Tooele - One O'clock Hill TIS**
Analysis Period: ***Future (2026) Background***
Time Period: ***Evening Peak Hour*** **Project #:** ***UT21-2019***

Intersection: **Main Street (S.R. 36) & 3 O'Clock Drive**
Type: **Unsignalized**

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***35***	***40***	***113***	***14.9***	***B***
	R	5	5	95	4.2	*A*
	Subtotal	40	45	113	13.7	*B*
NE	L	10	9	88	2.2	*A*
	T	695	692	100	2.3	*A*
	Subtotal	705	701	99	2.3	*A*
SW	T	412	409	99	1.1	*A*
	R	40	45	113	0.2	*A*
	Subtotal	452	454	100	1.0	*A*
Total		1,197	1,200	100	2.3	*A*

HALES ENGINEERING
innovative transportation solutions

SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Future (2026) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Settlement Canyon Road & Main Street (S.R. 36)
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
EB	T	727	739	102	2.3	*A*
	R	10	11	107	1.2	*A*
	Subtotal	737	750	102	2.3	*A*
WB	L	46	46	100	6.7	*A*
	T	595	595	100	0.5	*A*
	Subtotal	641	641	100	0.9	*A*
NW	***L***	***5***	***5***	***95***	***26.3***	***D***
	R	32	32	99	7.4	*A*
	Subtotal	37	37	100	10.0	*A*
Total		1,415	1,428	101	1.9	*A*

Intersection: Main Street (S.R. 36) & Access 2/900 South
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	T	1	1	100	18.8	*C*
	R	7	7	97	8.4	*A*
	Subtotal	9	8	89	9.7	*A*
SE	***L***	***80***	***83***	***103***	***21.2***	***C***
	T	2	2	100	18.5	*C*
	R	5	6	114	10.7	*B*
	Subtotal	87	91	105	20.4	*C*
NE	L	10	8	78	3.0	*A*
	T	650	660	102	1.2	*A*
	R	2	2	100	0.3	*A*
	Subtotal	662	670	101	1.2	*A*
SW	L	12	13	106	3.9	*A*
	T	449	446	99	1.5	*A*
	R	140	141	101	1.1	*A*
	Subtotal	601	600	100	1.5	*A*
Total		1,360	1,369	101	2.7	*A*

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SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Future (2026) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Access 3/Bus Depot Access
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	R	7	8	110	6.1	*A*
	Subtotal	8	8	100	6.1	*A*
SE	***L***	***30***	***29***	***96***	***17.0***	***C***
	R	10	11	107	4.5	*A*
	Subtotal	40	40	100	13.6	*B*
NE	L	5	5	95	1.6	*A*
	T	624	631	101	1.4	*A*
	R	2	3	150	0.2	*A*
	Subtotal	631	639	101	1.4	*A*
SW	L	11	10	89	2.9	*A*
	T	438	437	100	0.7	*A*
	R	5	5	95	0.1	*A*
	Subtotal	454	452	100	0.7	*A*
Total		1,134	1,139	100	1.6	*A*

Intersection: Main Street (S.R. 36) & Coleman Street
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
SE	***L***	***10***	***8***	***78***	***16.5***	***C***
	R	50	50	100	4.5	*A*
	Subtotal	60	58	97	6.2	*A*
NE	L	125	128	102	3.9	*A*
	T	618	628	102	1.4	*A*
	Subtotal	743	756	102	1.8	*A*
SW	T	415	417	100	0.4	*A*
	R	25	24	96	0.1	*A*
	Subtotal	440	441	100	0.4	*A*
Total		1,243	1,255	101	1.5	*A*

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SimTraffic LOS Report

Project: Tooele - One O'clock Hill TIS
Analysis Period: *Future (2026) Plus Project*
Time Period: *Evening Peak Hour* **Project #:** *UT21-2019*

Intersection: Main Street (S.R. 36) & Access 5/3 O'Clock Drive
Type: Unsignalized

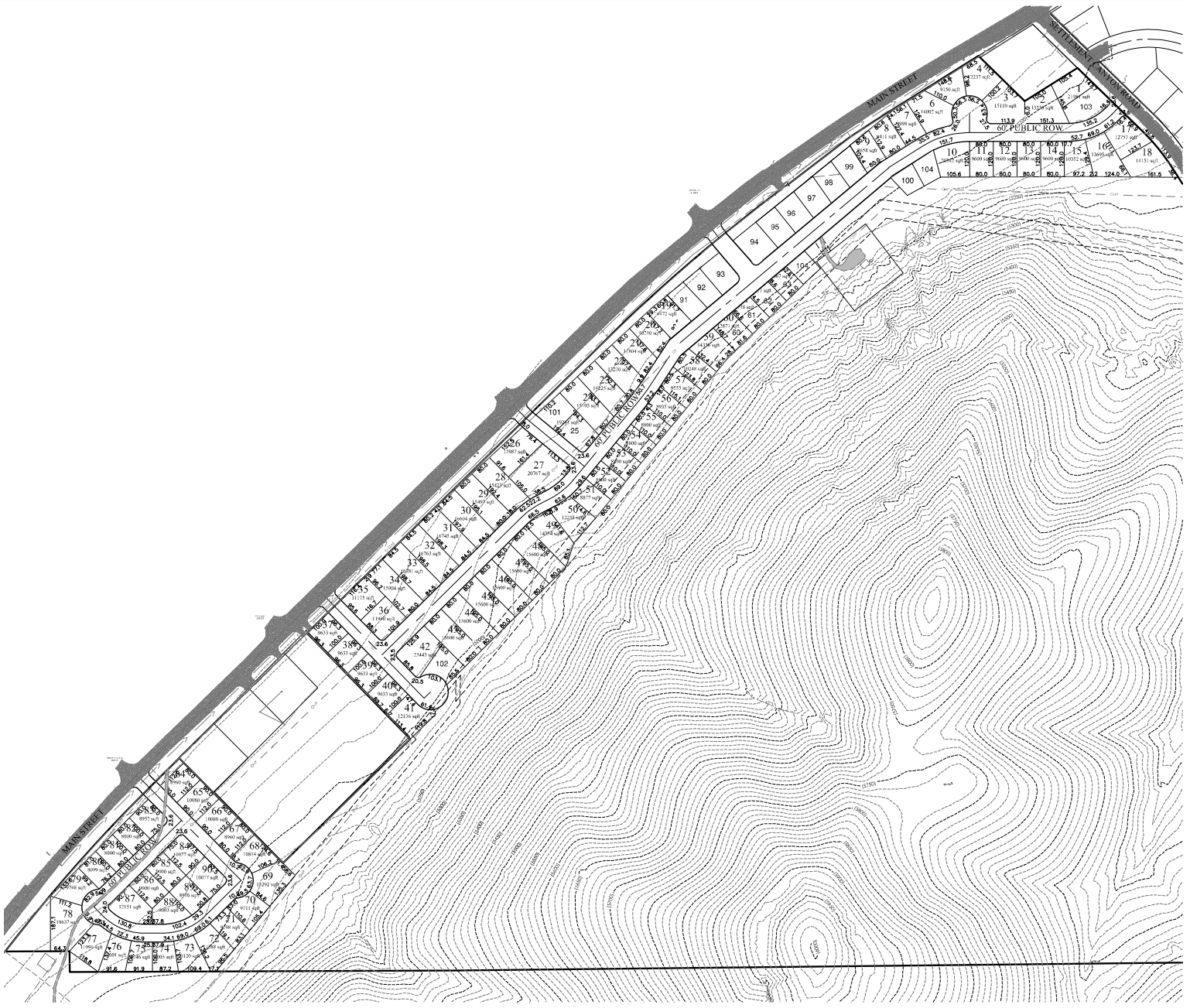
Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	T	***1***	***1***	***100***	***19.2***	***C***
	R	6	7	112	7.4	*A*
	Subtotal	8	8	100	8.9	*A*
SE	L	35	38	108	15.0	*B*
	T	1	1	100	9.1	*A*
	R	5	6	114	4.6	*A*
	Subtotal	41	45	110	13.5	*B*
NE	L	10	10	98	1.9	*A*
	T	701	711	101	2.6	*A*
	R	1	1	100	0.7	*A*
	Subtotal	712	722	101	2.6	*A*
SW	L	11	11	98	2.9	*A*
	T	414	413	100	1.3	*A*
	R	40	43	108	0.3	*A*
	Subtotal	465	467	100	1.2	*A*
Total		1,227	1,242	101	2.5	*A*

Intersection: Main Street (S.R. 36) & Access 4
Type: Unsignalized

Approach	Movement	Demand Volume	Volume Served		Delay/Veh (sec)	
			Avg	%	Avg	LOS
NW	L	1	0	0		
	R	***6***	***8***	***128***	***5.8***	***A***
	Subtotal	7	8	114	5.8	*A*
NE	T	626	632	101	0.3	*A*
	R	2	3	150	0.1	*A*
	Subtotal	628	635	101	0.3	*A*
SW	L	11	9	80	3.5	*A*
	T	438	439	100	1.1	*A*
	Subtotal	449	448	100	1.1	*A*
Total		1,084	1,091	101	0.7	*A*

APPENDIX C

Site Plan



N

W E

S

GRAPHIC SCALE

(IN FEET)
1 inch = 150ft.

R1-8 ZONE REQUIREMENTS

ZONE:	R1-8
LOT SIZE:	8,000 SF
FRONTAGE:	35'
LOT WIDTH:	75'
CUL-DE-SAC RADIUS:	60'
ROW WIDTH:	60'

GENERAL NOTE:

INFORMATION PROVIDED ON THIS PLAN IS BASED ON THE BEST AVAILABLE DATA AT THE TIME OF PREPARATION AND MAY CHANGE AT ANYTIME FOR ANY REASON. THIS PLAN IS FOR ILLUSTRATIVE PURPOSES ONLY.

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ONE O'CLOCK HILL

TOOELE CITY, TOOELE COUNTY, UTAH

CONCEPT PLAN

REVISION BLOCK:		
#	DATE:	DESCRIPTION:
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---
6	---	---

CONCEPT PLAN

Scale:	1"=150'	Drawn:	CJG
Date:	08/17/18	Job #:	17-455
Sheet:	B		

APPENDIX D

95th Percentile Queue Length Reports

SimTraffic Queueing Report

Project: Tooele - One O'clock Hill TIS

Analysis: Existing (2021) Background

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

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Project #: UT21-2019

Intersection	NE		NW	SE			SW		WB
	L	LT	LR	L	LR	R	R	T	L
01: Settlement Canyon Road & Main Street (S.R. 36)			50						50
02: Main Street (S.R. 36) & 900 South	25				75			0	
03: Main Street (S.R. 36) & Bus Depot Access	25				75				
04: Main Street (S.R. 36) & Coleman Street	75			25		50	25		
05: Main Street (S.R. 36) & 3 O'Clock Drive		25			50				

SimTraffic Queueing Report

Project: Tooele - One O'clock Hill TIS

Analysis: Existing (2021) Plus Project

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

HALES ENGINEERING
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Project #: UT21-2019

Intersection	NE		NW		SE			SW	WB
	L	LTR	LR	LTR	L	LTR	R	L	L
01: Settlement Canyon Road & Main Street (S.R. 36)			50						50
02: Main Street (S.R. 36) & Access 2/900 South	25			50		75		25	
03: Main Street (S.R. 36) & Access 3/Bus Depot Access	25			50		75		25	
04: Main Street (S.R. 36) & Coleman Street	75				25		50		
05: Main Street (S.R. 36) & Access 5/3 O'Clock Drive		25		50		50		25	
06: Main Street (S.R. 36) & Access 4			50					25	

SimTraffic Queueing Report

Project: Tooele - One O'clock Hill TIS

Analysis: Future (2026) Background

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

HALES ENGINEERING
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Project #: UT21-2019

Intersection	NE		NW	SE			SW	EB	WB
	L	LT	LR	L	LR	R	R	R	L
01: Settlement Canyon Road & Main Street (S.R. 36)			50					25	50
02: Main Street (S.R. 36) & 900 South	25				75				
03: Main Street (S.R. 36) & Bus Depot Access	25				75				
04: Main Street (S.R. 36) & Coleman Street	75			50		75	0		
05: Main Street (S.R. 36) & 3 O'Clock Drive		50			75				

SimTraffic Queueing Report

Project: Tooele - One O'clock Hill TIS

Analysis: Future (2026) Plus Project

Time Period: Evening Peak Hour

95th Percentile Queue Length (feet) - Rounded Up to Nearest Multiple of 25 ft

HALES ENGINEERING
innovative transportation solutions

Project #: UT21-2019

Intersection	NE		NW		SE			SW		EB	WB
	L	LTR	LR	LTR	L	LTR	R	L	R	T	L
01: Settlement Canyon Road & Main Street (S.R. 36)			75							25	75
02: Main Street (S.R. 36) & Access 2/900 South	25			50		100		25			
03: Main Street (S.R. 36) & Access 3/Bus Depot Access	25			50		75		25			
04: Main Street (S.R. 36) & Coleman Street	75				50		75		25		
05: Main Street (S.R. 36) & Access 5/3 O'Clock Drive		25		50		75		25			
06: Main Street (S.R. 36) & Access 4			50					25			

EARTHTEC ENGINEERING

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Geotechnical Study
One O'clock Hill
Settlement Canyon Road and UT-36
Tooele, Utah

Project No. 219074

November 2, 2021

Prepared For:

SJ Company
Attention: Mr. Shaun Johnson
447 North Cooley Street
Grantsville, UT 84029

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APPENDIX A

Timpview Analytical Labs
OSHPD-U.S. Seismic Design Maps

1.0 SUMMARY

This entire report presents the results of Earthtec Engineering's completed geotechnical study for the One O'clock Hill in Tooele, Utah. This summary provides a general synopsis of our recommendations and findings. Details of our findings, conclusions, and recommendations are provided within the body of this report.

- The native clay soils have a negligible potential for collapse (settlement) and a slight potential for compression under increased moisture contents and anticipated load conditions. (see Section 6)
- Conventional strip and spread footings may be used to support the structures, with foundations placed entirely on firm, undisturbed, uniform native soils (i.e. completely on clay soils, or completely on sand soils, etc.), or entirely on a minimum of 12 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 4,000 pounds per linear foot for bearing walls and up to 30,000 pounds for column loads. If loads exceed these see Section 10 for further recommendations.

Based on the results of our field exploration, laboratory testing, and engineering analyses, it is our opinion that the subject site may be suitable for the proposed development, provided the recommendations presented in this report are followed and implemented during design and construction.

Failure to consult with Earthtec Engineering (Earthtec) regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site. We also strongly recommend that Earthtec observes the building excavations to verify the adequacy of our recommendations presented herein, and that Earthtec performs materials testing and special inspections for this project to provide continuity during construction.

2.0 INTRODUCTION

The project is located at approximately Settlement Canyon Road and UT-36 in Tooele, Utah. The general location of the site is shown on Figure No. 1, *Vicinity Map* and Figure No. 2, *Site Plan Showing Location of Test Pits and Slope Cross-Sections*, at the end of this report. The purposes of this study are to evaluate the subsurface soil conditions at the site, assess the engineering characteristics of the subsurface soils, and provide geotechnical recommendations for general site grading and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork, and asphalt paved residential streets.

The scope of work completed for this study included field reconnaissance, subsurface exploration, field and laboratory soil testing, geotechnical engineering analysis, and the preparation of this report.

3.0 PROPOSED CONSTRUCTION

We understand that the proposed project, as described to us by Mr. Shaun Johnson, consists of subdividing the approximately 38-acre span of three existing parcels with the construction of a new residential subdivision containing up to 130 lots. The proposed structures will consist of conventionally framed, one- to two-story, single-family dwellings with basements. We have based our recommendations in this report that the anticipated foundation loads for the proposed structures will not exceed 4,000 pounds per linear foot for bearing walls, 30,000 pounds for column loads, and 100 pounds per square foot for floor slabs. If structural loads will be greater Earthtec should be notified so that we may review our recommendations and make modifications, if necessary.

In addition to the construction described above, we anticipate that utilities will be installed to service the proposed buildings, exterior concrete flatwork will be placed in the form of curb, gutter, sidewalks, driveways, and asphalt paved residential streets will be constructed.

4.0 GENERAL SITE DESCRIPTION

4.1 Site Description

At the time of our subsurface exploration the site consisted of three undeveloped parcels vegetated with native grasses, trees, and sagebrush. Large power line poles run northeast-southwest throughout the property, and a pump house is built on the northern section against the mountain slope with an asphalt driveway leading to it. An emergency two-track road exists running along the central run of powerlines and does not appear to be regularly maintained, according to local residents at the south end of the property. The ground surface appears to be relatively flat past the edge of the mountain slopes, we anticipate less than 3 feet of cut and fill may be required for site grading. The lot was bounded on the northwest by UT-36 Highway, on the southeast by open mountainous land, on the southwest by open field, and on the northeast by Settlement Canyon Road.

4.2 Geologic Setting

The subject property is located in the southeastern portion of Tooele Valley near the western slope of the Oquirrh Mountains. Tooele Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province. The valley was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. The valley is bordered by the Oquirrh Mountains on the east and the Stansbury Mountains on the west. Much of northwestern Utah, including Tooele Valley, was previously covered by the Pleistocene age Lake Bonneville. The Great Salt Lake, which borders Tooele Valley to the north, is a remnant of this ancient fresh water lake. The surficial geology of much of the eastern margin of the valley has been mapped by Clark, et al., 2017[1]. The surficial geology at the location of the subject site and

[1] Clark, D.L., Oviatt, C.G., Dinter, D.A., 2017, Interim Geologic Map of the Tooele 30'x60' Quadrangle, *Tooele, Salt*

adjacent properties contains four geologic units which are mapped as "Lacustrine and alluvial deposits, undivided" (Map Unit Qla), "Younger fan alluvium, post-Lake Bonneville (Map unit Qafy), "Older fan alluvium, pre-Lake Bonneville" (Map unit Qafo), and "Oquirrh Group, Bingham Mine Formation, upper member" (IPobmu) dated from the upper Pennsylvanian (IPobmu) to the Holocene (Qla) and middle- to upper-Pleistocene (Qafy and Qafo). The named geologic units are described, in part, below:

Qafy **Younger fan alluvium, post-Lake Bonneville (Holocene to uppermost Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; deposited by streams, debris flows, and flash floods on alluvial fans and in mountain valleys; merges with unit Qal; includes alluvium and colluvium in canyon and mountain valleys; may include areas of eolian deposits and lacustrine fine-grained deposits below the Bonneville shoreline; includes active and inactive fans younger than Lake Bonneville, but may also include some older deposits above the Bonneville shoreline.

Qafo **Older fan alluvium, pre-Lake Bonneville (upper to middle? Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; similar to unit Qafy, but forms higher level incised deposits that predate Lake Bonneville; includes fan surfaces of different levels; fans are incised by younger alluvial deposits and locally etched by Lake Bonneville.

Qla **Lacustrine and alluvial deposits, undivided (Holocene to upper Pleistocene)** – Sand, gravel, silt, and clay; consist of alluvial deposits reworked by lakes, lacustrine deposits reworked by streams and slopewash, and alluvial and lacustrine deposits that cannot be readily differentiated at map scale.

IPobmu **Oquirrh Group, Bingham Mine Formation, upper member (Upper Pennsylvanian, Virgilian-Missourian)** – Light gray to tan, thinly color-banded and locally cross-bedded quartzite with interbedded thin, light- to medium-gray, calcareous, fine-grained sandstone, limestone, and siltstone.

Additionally, a surface fault rupture hazard study and a rock fall hazard study were conducted at the subject site as part of this investigation. The results for those studies can be found in their respective reports and not as a part of the geotechnical investigation.

5.0 SUBSURFACE EXPLORATION

5.1 Soil Exploration

Under the direction of a qualified member of our geotechnical staff, subsurface explorations were conducted at the site on September 21 and 22, 2021 by the excavation of ten (10) test pits to

Lake, and Davis Counties, Utah; Utah Geological Survey, Open-File 669DM, Scale 1: 62,500.

depths of 4 to 10 feet below the existing ground surface using a a track-mounted excavator. The approximate locations of the test pits are shown on Figure No. 2, *Site Plan Showing Location of Test Pits and Slope Cross-Sections*. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 12, *Test Pit Log* at the end of this report. The stratification lines shown on the logs represent the approximate boundary between soil units; the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points. A key to the symbols and terms on the logs is presented on Figure No. 13, *Legend*.

Disturbed bag samples and relatively undisturbed block samples were collected at various depths in each test pit.

The soil samples collected were classified by visual examination in the field following the guidelines of the Unified Soil Classification System (USCS). The samples were transported to our Lindon, Utah laboratory where they will be retained for 30 days following the date of this report and then discarded, unless a written request for additional holding time is received prior to the 30-day limit.

6.0 LABORATORY TESTING

Representative soil samples collected during our field exploration were tested in the laboratory to assess pertinent engineering properties and to aid in refining field classifications, if needed. Tests performed included natural moisture contents, dry density tests, liquid and plastic limits determinations, mechanical (partial) gradation analyses, direct shear tests, and a one-dimensional consolidation test. The laboratory test results are also included on the attached *Test Pit Logs* at the respective sample depths, on Figure No. 14, *Consolidation-Swell Test,* on Figure Nos. 15 and 16, *Direct Shear Test*, and on Figure Nos. 17 through 20, *Stability Results*.

As part of the consolidation test procedure, water was added to a sample to assess moisture sensitivity when the sample was loaded to an equivalent pressure of approximately 1,000 psf. The native clay soils have a negligible potential for collapse (settlement) and a slight potential for compressibility under increased moisture contents and anticipated load conditions.

A water-soluble sulfate test was performed on a representative sample obtained during our field exploration which indicated a value of less than 10 parts per million. Based on this result, the risk of sulfate attack to concrete appears to be "negligible" according to American Concrete Institute standards. Therefore, there are no restrictions on the type of Portland cement that may be used for concrete in contact with on-site soils. The results can be found in Appendix A.

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

On the surface of the site, we encountered topsoil which is estimated to extend about ½ to 1 foot

in depth at the test pit locations. Below the topsoil we encountered layers of primarily gravel, sand, and bedrock, extending to depths of 4 to 10 feet below the existing ground surface. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 12, *Test Pit Log* at the end of this report. Based on our experience and observations during field exploration, the clay soils visually were stiff in consistency and the sand and gravel soils visually had a relative density varying from loose to very dense.

It should be considered that a limited number of test pits were used during the course of our subsurface exploration. Topsoil and fill material composition and contacts are difficult to determine from test pit sampling. Variation in topsoil depths may occur at the site.

7.2 Collapsible Soils

Collapsible soils are typically characterized by a pinhole structure and relatively low unit weights. Foundations, floor slabs, and roadways supported on these soils may be susceptible to large settlements and structural distress when wetted. Significantly collapsible soils were not encountered in our explorations.

7.3 Groundwater Conditions

Groundwater was not encountered within the excavations at the depths explored. Note that groundwater levels will fluctuate in response to the season, precipitation, snow melt, irrigation, and other on and off-site influences. Quantifying these fluctuations would require long term monitoring, which is beyond the scope of this study. The contractor should be prepared to dewater excavations as needed.

8.0 SITE GRADING

8.1 General Site Grading

All surface vegetation and unsuitable soils (such as topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, collapsible, and any other inapt materials) should be removed from below foundations, floor slabs, exterior concrete flatwork, and pavement areas. We encountered topsoil on the surface of the site. The topsoil (including soil with roots larger than about ¼ inch in diameter) should be completely removed, even if found to extend deeper, along with any other unsuitable soils that may be encountered. Over-excavations below footings and slabs also may be needed, as discussed in Section 10.0.

Fill placed over large areas, even if only a few feet in depth, can cause consolidation in the underlying native soils resulting in settlement of the fill. Because the site is relatively flat, we anticipate that less than 3 feet of grading fill will be placed. If more than 3 feet of grading fill will be placed above the existing surface (to raise site grades), Earthtec should be notified so that we may provide additional recommendations, if required. Such recommendations will likely include placing the fill several weeks (or possibly more) prior to construction to allow settlement to occur.

8.2 Temporary Excavations

Temporary excavations that are less than 4 feet in depth and above groundwater should have side slopes no steeper than ½H:1V (Horizontal:Vertical). Temporary excavations where water is encountered in the upper 4 feet or that extend deeper than 4 feet below site grades should be sloped or braced in accordance with OSHA[2] requirements for Type B soils.

8.3 Fill Material Composition

Structural fill is defined as imported fill material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements, etc. Gradation requirements stated below shall be verified in intervals not exceeding 1,000 tons. We recommend that imported structural fill consist of sandy/gravelly soils meeting the following requirements in the table below:

Table 1: Imported Structural Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
4 inches	100
3/4 inches	70 – 100
No. 4	40 – 80
No. 40	15 – 50
No. 200	0 – 20
Liquid Limit	35 maximum
Plasticity Index	15 maximum

Engineered fill is defined as reworked granular (sands or gravels), native material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements. Native clay and silt soils are not suitable for use as engineered fill. We recommend that a professional engineer or geologist verify that the engineered fill to be used on this project meets the requirements. Engineered fill should be clear of all organics, have a maximum particle size of 4 inches, less than 70 percent retained on the ¾-seive, a maximum Liquid Limit of 35, and a maximum Plasticity Index of 15.

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable but would likely make compaction more difficult and/or significantly reduce the possibility of successful compaction testing. Consequently, stricter quality control measures than normally used may be required, such as using thinner lifts and increased or full-time observation of fill placement.

We recommend that utility trenches below any structural load be backfilled using structural fill or engineered fill. Local governments or utility companies required specification for backfill should be followed unless our recommendations stricter.

If native soil is used as fill material, the contractor should be aware that native clay and silt soils

[2] OSHA Health and Safety Standards, Final Rule, CFR 29, part 1926.

(as observed in the explorations) may be time consuming to compact due to potential difficulties in controlling the moisture content needed to obtain optimum compaction and changes proctor values.

If required (i.e. fill in submerged areas), we recommend that free draining granular material (clean sand and/or gravel) meet the following requirements in the table below:

Table 2: Free-Draining Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
3 inches	100
No. 10	0 – 25
No. 40	0 – 15
No. 200	0 – 5
Plasticity Index	Non-plastic

Three-inch minus washed rock (sometimes called river rock or drain rock) and pea gravel materials usually meet these requirements and may be used as free draining fill. If free draining fill will be placed adjacent to soil containing a significant amount of sand or silt/clay, precautions should be taken to prevent the migration of fine soil into the free draining fill. Such precautions should include either placing a filter fabric between the free draining fill and the adjacent soil material, or using a well-graded, clean filtering material approved by the geotechnical engineer.

8.4 Fill Placement and Compaction

Fill should be placed on level, horizontal surfaces. Where fill will be placed on existing slopes steeper than 5H:1V, the existing ground should be benched prior to placing fill. We recommend bench heights of 1 to 4 feet, with the lowest bench being a minimum 3 feet below adjacent grade and at least 10 feet wide.

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness prior to compaction of 4 inches for hand operated equipment, 6 inches for most "trench compactors" and 8 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to at least the following percentages of the maximum dry density, as determined by ASTM D-1557:

- In landscape and other areas not below structurally loaded areas: 90%
- Less than 5 feet of fill below structurally loaded areas: 95%
- 5 feet or greater of fill below structurally loaded areas: 98%

Generally, placing and compacting fill at moisture contents within ±2 percent of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. Typically, the further the moisture content deviates from optimum the more difficult it will be to achieve the required compaction.

Fill should be tested frequently during placement and we recommend early testing to demonstrate

that placement and compaction methods are achieving the required compaction. The contractor is responsible to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

8.5 Stabilization Recommendations

Near surface soils may rut and pump during grading and construction. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment, partially loaded equipment, tracked equipment, by working in dry times of the year, and/or by providing a working surface for equipment.

During grading the soil in any obvious soft spots should be removed and replaced with granular material. If rutting or pumping occurs traffic should be stopped in the area of concern. The soil in rutted areas should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 24 inches.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of four inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. Materials which are more angular and coarse may require thinner lifts in order to achieve compaction. We recommend that the fines content (percent passing the No. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plasticity index be less than 15.

Using a geosynthetic fabric, such as Mirafi 600X or equivalent, may also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation a minimum of 24 inches. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should then be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC AND GEOLOGIC CONSIDERATIONS

9.1 Seismic Design

The State of Utah has adopted the 2015 International Residential Code (IRC) and residential structures should be designed in accordance with the 2015 IRC. The IRC designates this area as a seismic design class D_0.

The site is located at approximately 40.513 degrees latitude and -112.311 degrees longitude from the approximate center of the site. The IRC site value for this property is 0.583g. The design spectral response acceleration parameters are given below.

Table 3: Design Acceleration for Short Period

S_S	F_a	Site Value (S_{DS})
		2/3 S_S*F_a
0.709g	1.233	0.583g

9.2 Faulting

The subject property is located within the Intermountain Seismic Belt where the potential for active faulting and related earthquakes is present. Based upon published geologic maps[3], no active faults traverse through the site and the site is not located within local fault study zones. However, an implied trace of the Oquirrh Fault Zone is mapped along the northwest edge of UT-36 which runs along the northwest boundary of the subject site. A surface fault rupture hazard study was performed on the property, the results of which are detailed in a separate report.

9.3 Liquefaction Potential

According to current liquefaction maps[4] for Tooele Valley, the site is located within an area designated as "Very Low" in liquefaction potential. Liquefaction can occur when saturated subsurface soils below groundwater lose their inter-granular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. Loose, saturated sands are most susceptible to liquefaction, but some loose, saturated gravels and relatively sensitive silt to low-plasticity silty clay soils can also liquefy during a seismic event. Subsurface soils encountered were composed of unsaturated sand and gravel soils.

The soils encountered at this project do not appear liquefiable, but the liquefaction susceptibility of underlying soils (deeper than our explorations) is not known and would require deeper explorations to quantify.

10.0 FOUNDATIONS

10.1 General

The foundation recommendations presented in this report are based on the soil conditions encountered during our field exploration, the results of laboratory testing of samples of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction*, of this report. If loading conditions and assumptions related to foundations are significantly different, Earthtec should be notified so

[3] U.S. Geological Survey, Quaternary Fault and Fold Database of the United States, November 3, 2010.
[4] Utah Geological Survey, Liquefaction Susceptibility Map for Tooele Valley, Tooele County, Utah, Public Information Series 80, August 2003.

that we can re-evaluate our design parameters and estimates (higher loads may cause more settlement), and to provide additional recommendations if necessary.

Conventional strip and spread footings may be used to support the proposed structures after appropriate removals as outlined in Section 8.1. Foundations should not be installed on topsoil, undocumented fill, debris, combination soils, organic soils, frozen soil, or in ponded water. If foundation soils become disturbed during construction, they should be removed or compacted.

10.2 Strip/Spread Footings

We recommend that conventional strip and spread foundations be constructed entirely on firm, undisturbed, uniform native soils (i.e. completely on clay soils, or completely on sand soils, etc.), or entirely on a minimum of 12 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 4,000 pounds per linear foot for bearing walls and up to 30,000 pounds for column loads. If loads exceed 4,000 pounds per linear foot for bearing walls or 30,000 pounds for column loads, please contact Earthtec for further recommendations. For foundation design we recommend the following:

- Footings founded on undisturbed native soils may be designed using a maximum allowable bearing capacity of 2,000 pounds per square foot. Footings founded on a minimum of 12 inches of structural fill extending to undisturbed native soil may be designed using a maximum allowable bearing capacity of 2,500 pounds per square foot. The values for vertical foundation pressure can be increased by one-third for wind and seismic conditions per Section 1806 when used with the Alternative Basic Load Combinations found in Section 1605.3.2 of the 2018 International Building Code.
- Continuous and spot footings should be uniformly loaded and should have a minimum width of 20 and 30 inches, respectively.
- Exterior footings should be placed below frost depth which is determined by local building codes. In general, 30 inches of cover is adequate for most sites; however local code should be verified by the end design professional. Interior footings, not subject to frost (heated structures), should extend at least 18 inches below the lowest adjacent grade.
- Foundation walls and footings should be properly reinforced to resist all vertical and lateral loads and differential settlement.
- The bottom of footing excavations should be compacted with at least 4 passes of an approved non-vibratory roller prior to erection of forms or placement of structural fill to densify soils that may have been loosened during excavation and to identify soft spots. If soft areas are encountered, they should be stabilized as recommended in Section 8.5.
- Footing excavations should be observed by the geotechnical engineer prior to beginning fill placement or footing construction if fill is not required to evaluate whether suitable bearing soils have been exposed and whether excavation bottoms are free of loose or disturbed soils.
- In lieu of traditional structural fill, clean 1- to 2-inch clean gravel may be used in conjunction

with a stabilization fabric, such as Mirafi 600X or equivalent, which should be placed between the native soils and the clean gravel (additional recommendations for placing clean gravel and stabilization fabric are given in Section 8.5 of this report).

- Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 18 inches of structural fill is required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 9 inches beyond the edge of the footings on both sides.

10.3 Estimated Settlements

If the proposed foundations are properly designed and constructed using the parameters provided above, we estimate that total settlements should not exceed one inch and differential settlements should be one-half of the total settlement over a 25-foot length of continuous foundation, for non-earthquake conditions. Additional settlement could occur during a seismic event due to ground shaking, if more than 3 feet of grading fill is placed above the existing ground surface, if loading conditions are greater than anticipated in Section 2, and/or if foundation soils are allowed to become wetted.

10.4 Lateral Earth Pressures

Below grade walls act as soil retaining structures and should be designed to resist pressures induced by the backfill soils. The lateral pressures imposed on a retaining structure are dependent on the rigidity of the structure and its ability to resist rotation. Most retaining walls that can rotate or move slightly will develop an active lateral earth pressure condition. Structures that are not allowed to rotate or move laterally, such as subgrade basement walls, will develop an at-rest lateral earth pressure condition. Lateral pressures applied to structures may be computed by multiplying the vertical depth of backfill material by the appropriate equivalent fluid density. Any surcharge loads in excess of the soil weight applied to the backfill should be multiplied by the appropriate lateral pressure coefficient and added to the soil pressure. For static conditions the resultant forces are applied at about one-third the wall height (measured from bottom of wall). For seismic conditions, the resultant forces are applied at about two-third times the height of the wall both measured from the bottom of the wall. The lateral pressures presented in the table below are based on drained, horizontally placed native soils as backfill material using a 35° friction angle and a dry unit weight of 120 pcf.

Table 4: Lateral Earth Pressures (Static and Dynamic)

Condition	Case	Lateral Pressure Coefficient	Equivalent Fluid Pressure (pcf)
Active	Static	0.27	33
	Seismic	0.34	41
At-Rest	Static	0.43	51
	Seismic	0.62	74
Passive	Static	3.69	443
	Seismic	6.50	779

*Seismic values combine the static and dynamic values

These pressure values do not include any surcharge and are based on a relatively level ground surface at the top of the wall and drained conditions behind the wall. It is important that water is not allowed to build up (hydrostatic pressures) behind retaining structures. Retaining walls should incorporate drainage behind the walls as appropriate, and surface water should be directed away from the top and bottom of the walls.

Lateral loads are typically resisted by friction between the underlying soil and footing bottoms. Resistance to sliding may incorporate the friction acting along the base of foundations, which may be computed using a coefficient of friction of soils against concrete of 0.30 for native clay and silts, 0.40 for native sands, and 0.55 for native gravels, clean gravel, or structural fill meeting the recommendations presented herein. Concrete or masonry walls shall be selected and constructed in accordance with Section R404 of the 2015 International Residential Code or sections referenced therein. Retaining wall lateral resistance design should further reference Section R404.4 for reference of Safety Factors.

11.0 FLOOR SLABS AND FLATWORK

Concrete floor slabs and exterior flatwork may be supported on undisturbed native soils or on a minimum of 12 inches properly placed, compacted, and tested engineered fill or imported structural fill extending to undisturbed native soils after appropriate removals and grading as outlined in Section 8.1 are completed. We recommend placing a minimum of 4 inches of free-draining fill material (see Section 8.3) beneath floor slabs to facilitate construction, act as a capillary break, and aid in distributing floor loads. For exterior flatwork, we recommend placing a minimum of 4 inches of road-base material. Prior to placing the free-draining fill or road-base materials, the native sub-grade should be proof-rolled to identify soft spots, which should be stabilized as discussed above in Section 8.5.

For slab design, we recommend using a modulus of sub-grade reaction of 120 pounds per cubic inch. The thickness of slabs supported directly on the ground shall not be less than 3½ inches. A 6-mil polyethylene vapor retarder with joints lapped not less than 6 inches shall be placed between the ground surface and the concrete, as per Section R506 of the 2015 International Residential Code.

To help control normal shrinkage and stress cracking, we recommend that floor slabs have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints, frequent crack control joints, and non-rigid attachment of the slabs to foundation and bearing walls. Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

12.0 DRAINAGE

12.1 Surface Drainage

As part of good construction practice, precautions should be taken during and after construction to reduce the potential for water to collect near foundation walls. Accordingly, we recommend the following:

- The contractor should take precautions to prevent significant wetting of the soil at the base of the excavation. Such precautions may include: grading to prevent runoff from entering the excavation, excavating during normally dry times of the year, covering the base of the excavation if significant rain or snow is forecast, backfill at the earliest possible date, frame floors and/or the roof at the earliest possible date, other precautions that might become evident during construction.
- Adequate compaction of foundation wall backfill must be provided i.e. a minimum of 90% of ASTM D-1557. Water consolidation methods should not be used.
- The ground surface should be graded to drain away from the building in all directions. We recommend a minimum fall of 8 inches in the first 10 feet.
- Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits, or at least 10 feet from foundations, whichever is greater.
- Sprinkler nozzles should be aimed away, and all sprinkler components kept at least 5 feet, from foundation walls. A drip irrigation system may be utilized in landscaping areas within 10 feet of foundation walls to minimize water intrusion at foundation backfill. Also, sprinklers should not be placed at the top or on the face of slopes. Sprinkler systems should be designed with proper drainage and well maintained. Over-watering should be avoided.
- Any additional precautions which may become evident during construction.

12.2 Subsurface Drainage

Section R405.1 of the 2015 International Residential Code states, "Drains shall be provided

around all concrete and masonry foundations that retain earth and enclose habitable or usable spaces located below grade." Section R310.2.3.2 of the 2015 International Residential Code states, "Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system." An exception is allowed when the foundation is installed on well drained ground consisting of Group 1 soils, which include those defined by the Unified Soil Classification System as GW, GP, SW, SP, GM, and SM. The soils observed in the explorations at the depth of foundation consisted primarily of poorly-graded gravel (GP-GM) which is a Group 1 soil.

13.0 PAVEMENT RECOMMENDATIONS

We understand that asphalt paved residential streets will be constructed as part of the project. The native soils encountered beneath the topsoil during our field exploration were predominantly composed of gravels. We estimate that a California Bearing Ratio (CBR) value of 5 is appropriate for these soils. If the topsoil is left beneath concrete flatwork and pavement areas, increased maintenance costs over time should be anticipated.

We anticipate that the traffic volume will be about 1,250 vehicles per day (4.1 ESAL/day) or less for the residential streets, consisting of mostly cars and pickup trucks, with a daily delivery truck and a weekly garbage truck. Based on these traffic parameters, the estimated CBR given above, a 20-year life expectancy, and the procedures and typical design inputs outlined in the UDOT Pavement Design Manual (2008), we recommend the minimum asphalt pavement section presented below. The pavement section should meet the minimum values are required by the jurisdiction or the values below, whichever is greater.

Table 5: Pavement Section Recommendations

Asphalt Thickness (in)	Compacted Aggregate Base Thickness (in)	Compacted Subbase Thickness (in)
3	8*	0

* Stabilization may be required

If the pavement will be required to support excessive construction traffic (such as dump trucks hauling soil to raise or lower the site), more than an occasional semi-tractor or fire truck, or more traffic than listed above, our office should be notified so that we can re-evaluate the pavement section recommendations. The following also apply:

- The subgrade should be prepared by proof rolling to a firm, non-yielding surface, with any identified soft areas stabilized as discussed above in Section 8.5.
- Site grading fills below the pavements should meet structural fill composition and placement recommendations per Sections 8.3 and 8.4 herein.
- Asphaltic concrete, aggregate base and sub-base material composition should meet local, APWA, or UDOT requirements. Gradation requirements and frequency shall be followed as

required by local, APWA, or UDOT requirements, but not to exceed 500 tons.

- Aggregate base and sub-base is compacted to local, APWA, or UDOT requirements, or to at least 95 percent of maximum dry density (ASTM D 1557).
- The aggregate base shall have a CBR value to 70 percent or greater and the subbase shall have a CBR value of 10 percent or greater.
- Asphaltic concrete is compacted to local or UDOT requirements, or to at least 96 percent of the laboratory Marshall density (ASTM D 6927).

14.0 SLOPE STABILITY

We evaluated the stability of the existing slopes as shown in Figure No. 2, *Site Plan Showing Location Test Pits and Slope Cross-Sections.* The properties of the soils observed at the site were determined from laboratory testing. Direct shear tests were run on samples obtained from our field exploration. The test results indicate that the silt soils have an internal friction angle of 35 degrees and a cohesion of 675 psf, while the gravel soils have an internal friction angle of 41 and a cohesion of 330 psf. We conservatively used the following soil strength parameters to run the slope stability on this lot:

Table 6: Soil Strength Parameters

Soil Classification	Moist Unit Weight (pcf)	Friction Angle (ϕ)	Cohesion (psf)
ML	121.3	35	675
GP-GM	117.0	41	330

For the seismic (pseudostatic) analysis, a peak horizontal ground acceleration of 0.299g for the 2% probability of exceedance in 50 years was obtained for site (grid) locations of 40.513 degrees latitude and -112.311 longitude. Typically, one-third this value is utilized in analysis. A peak horizontal ground acceleration of 0.099g was used as the pseudostatic coefficient for the stability analysis.

We evaluated the stability of the proposed site using the computer program XSTABL. This program uses a limit equilibrium (Bishop's modified) method for calculating factors of safety against sliding on an assumed failure surface and evaluates numerous potential failure surfaces, with the most critical failure surface identified as the one yielding the lowest factor of safety of those evaluated. The configuration analyzed was based on the historical photographs, our observations during the field investigation, and available topographic maps. The cross-section analyzed is shown on Figure No. 2, *Site Plan Showing Location of Test Pits and Slope Cross-Sections.*

Typically, the required minimum factors of safety are 1.5 for static conditions and 1.1 for seismic (pseudostatic) conditions. The results of our analyses indicate that the slope configuration at the proposed lot analyzed is stable under these conditions. The slope stability data are attached as Figure Nos. 17 through 20, *Stability Results.* If unretained cuts greater than 6 feet on the slope

area are planned or retaining walls, we recommend that further analysis of the slope be performed.

15.0 GENERAL CONDITIONS

The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project. The explorations may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the explorations may occur and which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, Earthtec should be advised immediately so that the appropriate modifications can be made.

The findings and recommendations presented in this geotechnical report were prepared in accordance with generally accepted geotechnical engineering principles and practice in this area of Utah at this time. No warranty or representation is intended in our proposals, contracts, letters, or reports. Failure to consult with Earthtec regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site.

This geotechnical report is based on relatively limited subsurface explorations and laboratory testing. Subsurface conditions may differ in some locations of the site from those described herein, which may require additional analyses and possibly modified recommendations. Thus, we strongly recommend consulting with Earthtec regarding any changes made during design and construction of the project from those discussed herein. Failure to consult with Earthtec regarding any such changes relieves Earthtec from any liability arising from changed conditions at the site.

To maintain continuity, Earthtec should also perform materials testing and special inspections for this project. The recommendations presented herein are based on the assumption that an adequate program of tests and observations will be followed during construction to verify compliance with our recommendations. We also assume that we will review the project plans and specifications to verify that our conclusions and recommendations are incorporated and remain appropriate (based on the actual design). Earthtec should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Earthtec also should be retained to provide observation and testing services during grading, excavation, foundation construction, and other earth-related construction phases of the project.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please contact Earthtec at your convenience.

Respectfully;

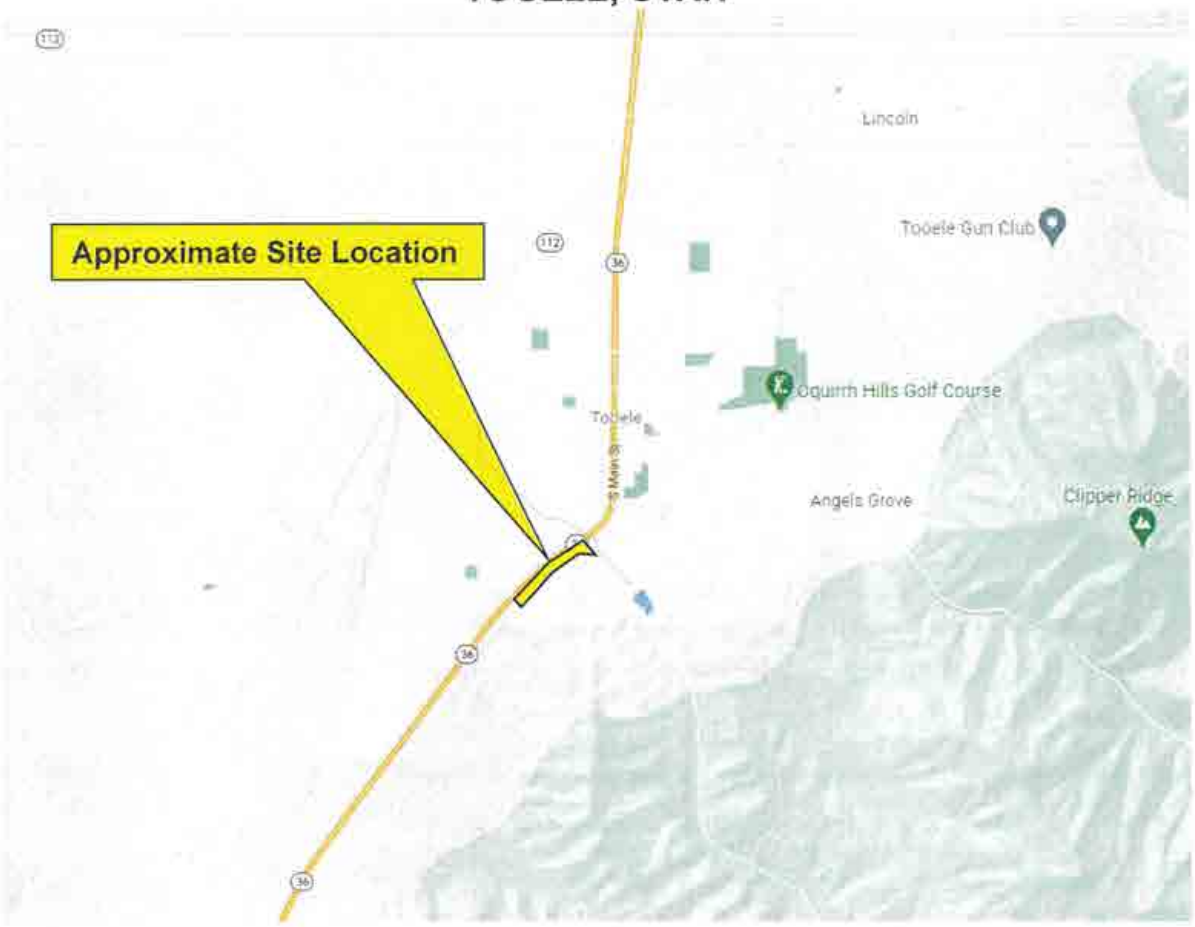
EARTHTEC ENGINEERING

Michael S. Schedel
Staff Geologist

Timothy A. Mitchell, P.E.
Senior Geotechnical Engineer

VICINITY MAP

ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH



N

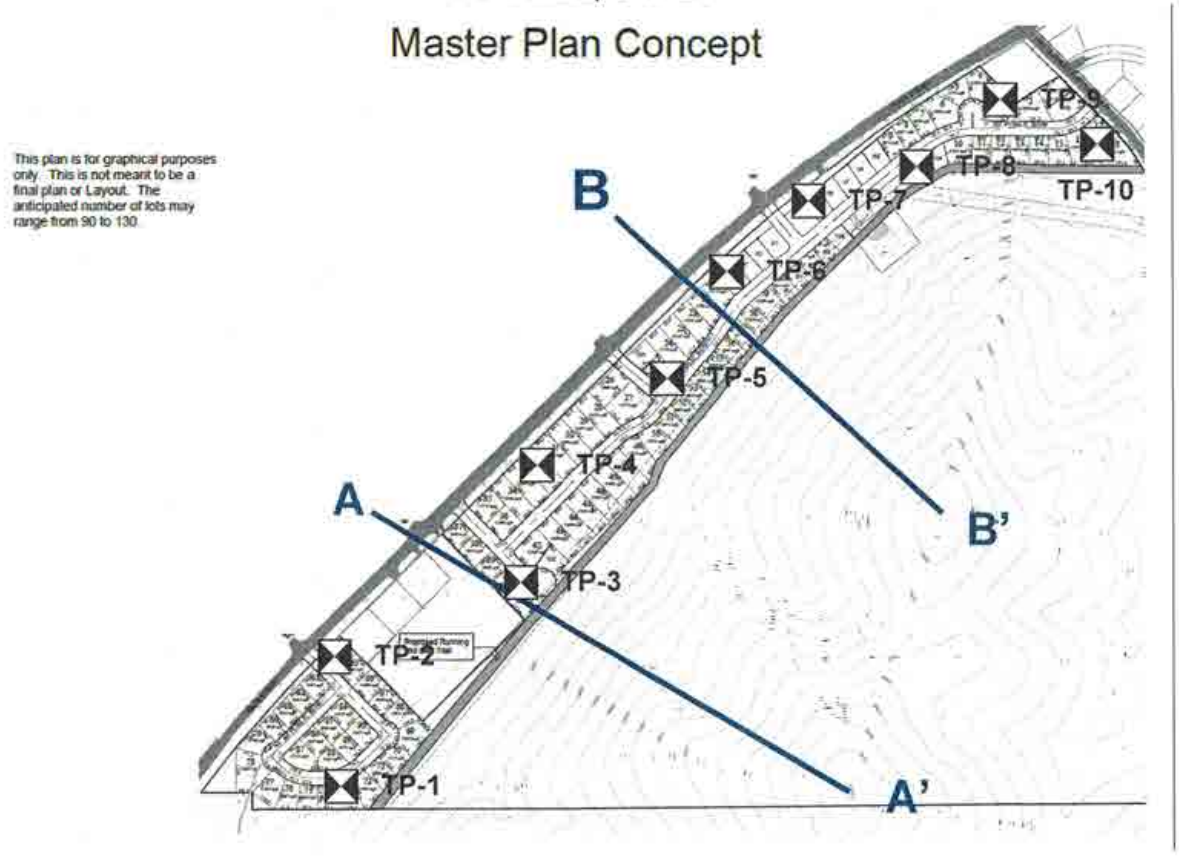
Not to Scale

PROJECT NO.: 219074		FIGURE NO.: 1

SITE PLAN SHOWING LOCATION OF TEST PITS AND SLOPE CROSS-SECTIONS

ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH

Master Plan Concept



*Site Plan provided by Client.

Approximate Test Pit Locations

Slope Cross-Section Locations

N

Not to Scale

PROJECT NO.: 219074	EARTHTEC ENGINEERING	FIGURE NO.: 2

TEST PIT LOG
NO.: TP-01

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy silt with gravel, dry, dark brown, organics									
1			Poorly Graded GRAVEL with sand, loose to very dense (estimated), dry, light brown									
2												
3		GP	...cobbles and boulders	X	1				67	31	2	
4												
5												
6			...large boulders	X								
			End of Test Pit at 6 Feet due to Large Boulders									
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 3

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-02

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0												
1			TOPSOIL, silty sand, dry, light brown, organics									
2		SM	Silty SAND with gravel, loose to medium dense (estimated), dry, brown, lightly cemented									
3				X								
4												
5		GP	Poorly Graded GRAVEL with sand, medium dense (estimated), dry, light brown	X	1		21	NP	51	44	5	
6												
7		SP	Poorly Graded SAND with gravel, medium dense (estimated), dry, light brown	X								
8			...gravel lenses encountered									
9												
10				X	3		23	NP	34	62	4	
11			Test Pit Terminated at 10 Feet									
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 4

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-03

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand with gravel, dry, light brown, organics									
1		GP-GM	Poorly Graded GRAVEL with silt and sand, dense to very dense (estimated), dry, brown, cobbles and boulders									
2			...large boulders									
3				X								
4			End of Test Pit at 4 Feet due to Quartzite Bedrock									
5												
6												
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 5

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-04

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand with gravel, dry, brown, organics, boulders									
1		CL-ML	Sandy Silty CLAY, stiff (estimated), slightly moist, brown and white, calcareous									
2												
3				X	7		25	7	1	40	59	
4												
5		ML	Sandy SILT, stiff to very stiff (estimated), slightly moist, brown, lightly cemented	X	3		22	NP	3	39	58	DS
6												
7			...with gravel	X								
8			End of Test Pit at 7½ Feet due to Large Boulders									
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 6

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-05

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/22/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0												
1			TOPSOIL, clayey sand with gravel, dry, brown, organics, boulders									
2		GP-GM	Poorly Graded GRAVEL with silt and sand, dense (estimated), dry, brown, cobbles and boulders	X								
3												
4			Quartzite BEDROCK, medium-grained, massive, light tan and white, moderately weathered, hard, moderately fractured									
			End of Test Pit at 4 Feet due to Bedrock									
5												
6												
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 7

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-06

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand with gravel, dry, light brown, organics									
1												
2		GP-GM	Poorly Graded GRAVEL with silt and sand, dense (estimated), dry, light brown, cobbles and boulders	X	2				57	32	11	
3												
4			Quartzite BEDROCK, medium-grained, massive, light tan and white, moderately weathered, hard, moderately fractured	X								
5			End of Test Pit at 4 Feet due to Bedrock									
6												
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 8

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-07

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0												
1			TOPSOIL, silty sand with gravel, dry, brown, organics, cobbles and boulders									
2		GP-GM	Poorly Graded GRAVEL with silt and sand, dense (estimated), dry, brown, angular boulders	X								
3												
4			Quartzite BEDROCK, medium-grained, massive, light tan and white, moderately weathered, hard, moderately fractured									
			End of Test Pit at 4 Feet due to Bedrock									
5												
6												
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 9

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-08

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/21/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, clayey sand with gravel, dry, brown, organics									
1		SP	Poorly Graded SAND with gravel, dense (estimated), dry, brown, cobbles									
2												
3			Quartzite BEDROCK, medium-grained, massive, light tan and white, moderately weathered, hard, moderately fractured	X								
4			End of Test Pit at 4 Feet due to Bedrock									
5												
6												
7												
8												
9												
10												
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 10

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-09

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/22/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, clayey sand with gravel, dry, brown, organics									
1		GP-GM	Poorly Graded GRAVEL with silt and sand, medium dense (estimated), dry, brown									
2												
3				X	2		19	NP	62	26	12	DS
4												
5		GM	Silty GRAVEL with sand, very dense (estimated), dry, white and light brown, moderately cemented	X								
6		CL-ML	Sandy Silty CLAY, stiff (estimated), slightly moist, light brown and white, calcareous									
7				■	13	98	26	4	6	37	57	C
8			...with gravel	X								
9			...clay lenses encountered									
10			Test Pit Terminated at 10 Feet									
11												
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 11

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

TEST PIT LOG
NO.: TP-10

PROJECT: One O'clock Hill
CLIENT: SJ Company
LOCATION: See Figure No. 2
OPERATOR: Blaine Hone Excavating
EQUIPMENT: Track Mounted Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 219074
DATE: 09/22/21
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, silty sand with gravel, dry, brown, organics									
1			Poorly Graded GRAVEL with silt and sand, loose to very dense (estimated), dry, brown, lightly cemented									
2			...boulders									
3				X								
4				X	2		24	NP	69	26	5	
5		GP-GM	...moderately cemented									
6				X								
7			...not cemented									
8				X	4				62	30	8	
9												
10												
11			Test Pit Terminated at 10 Feet									
12												

Notes: No groundwater encountered.

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 219074

EARTHTEC ENGINEERING

FIGURE NO.: 12

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 10/28/21

LEGEND

PROJECT: One O'clock Hill
CLIENT: SJ Company
DATE: 09/21/21
LOGGED BY: M. Schedel

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR SOIL DIVISIONS			USCS SYMBOL	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% retaining on No. 200 Sieve)	GRAVELS (More than 50% of coarse fraction retained on No. 4 Sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well Graded Gravel, May Contain Sand, Very Little Fines
			GP	Poorly Graded Gravel, May Contain Sand, Very Little Fines
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty Gravel, May Contain Sand
			GC	Clayey Gravel, May Contain Sand
	SANDS (50% or more of coarse fraction passes No. 4 Sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well Graded Sand, May Contain Gravel, Very Little Fines
			SP	Poorly Graded Sand, May Contain Gravel, Very Little Fines
		SANDS WITH FINES (More than 12% fines)	SM	Silty Sand, May Contain Gravel
			SC	Clayey Sand, May Contain Gravel
FINE GRAINED SOILS (More than 50% passing No. 200 Sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		CL	Lean Clay, Inorganic, May Contain Gravel and/or Sand
			ML	Silt, Inorganic, May Contain Gravel and/or Sand
			OL	Organic Silt or Clay, May Contain Gravel and/or Sand
	SILTS AND CLAYS (Liquid Limit Greater than 50)		CH	Fat Clay, Inorganic, May Contain Gravel and/or Sand
			MH	Elastic Silt, Inorganic, May Contain Gravel and/or Sand
			OH	Organic Clay or Silt, May Contain Gravel and/or Sand
HIGHLY ORGANIC SOILS			PT	Peat, Primarily Organic Matter

SAMPLER DESCRIPTIONS

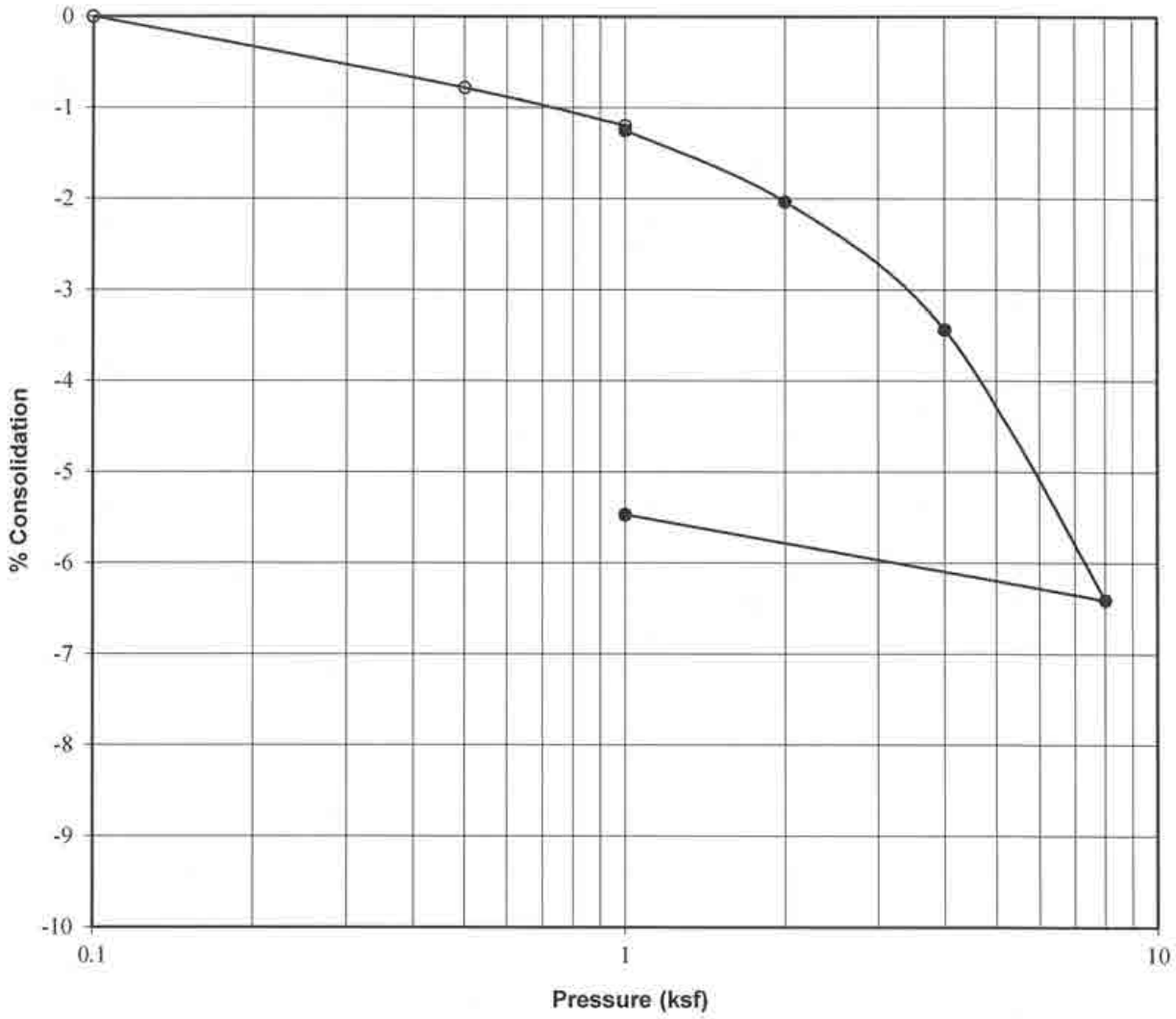
- SPLIT SPOON SAMPLER (1 3/8 inch inside diameter)
- MODIFIED CALIFORNIA SAMPLER (2 inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- BLOCK SAMPLE
- BAG/BULK SAMPLE

WATER SYMBOLS

- ▽ Water level encountered during field exploration
- ▼ Water level encountered at completion of field exploration

NOTES:
1. The logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs and any applicable graphs.
3. Strata lines on the logs represent approximate boundaries only. Actual transitions may be gradual.
4. In general, USCS symbols shown on the logs are based on visual methods only: actual designations (based on laboratory tests) may vary.

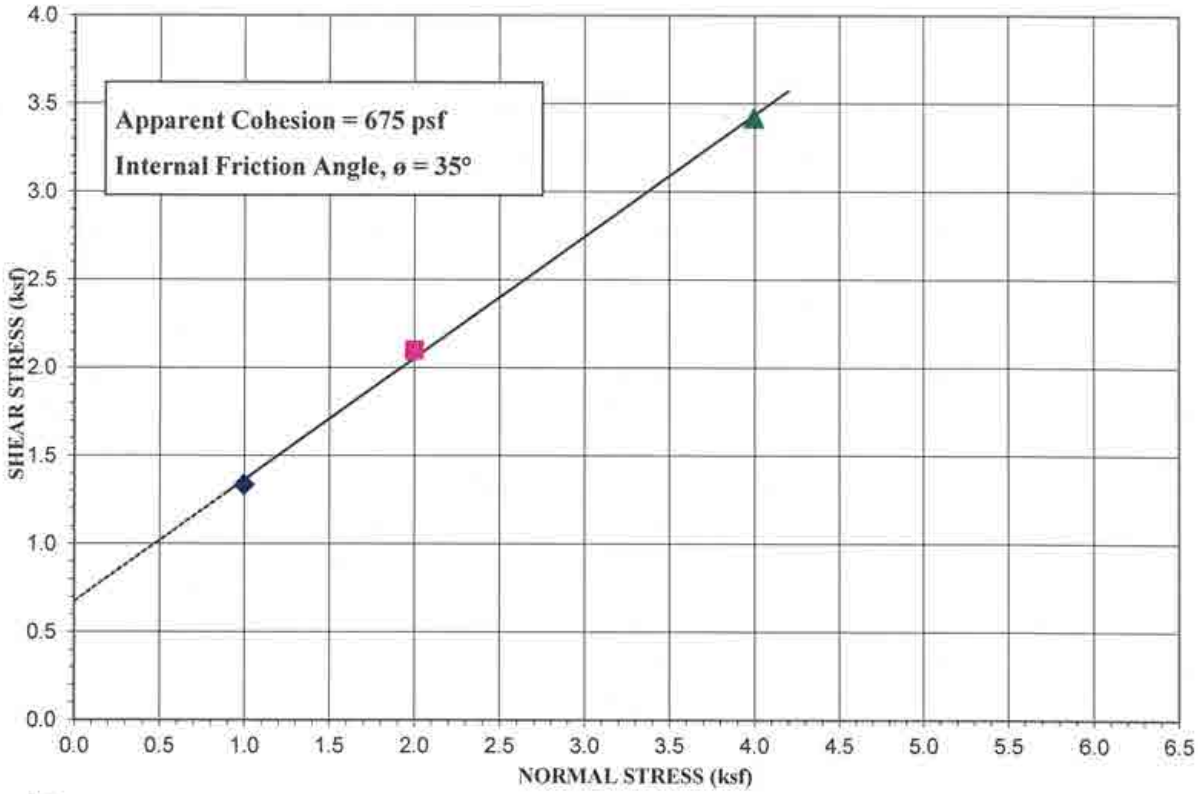
CONSOLIDATION - SWELL TEST

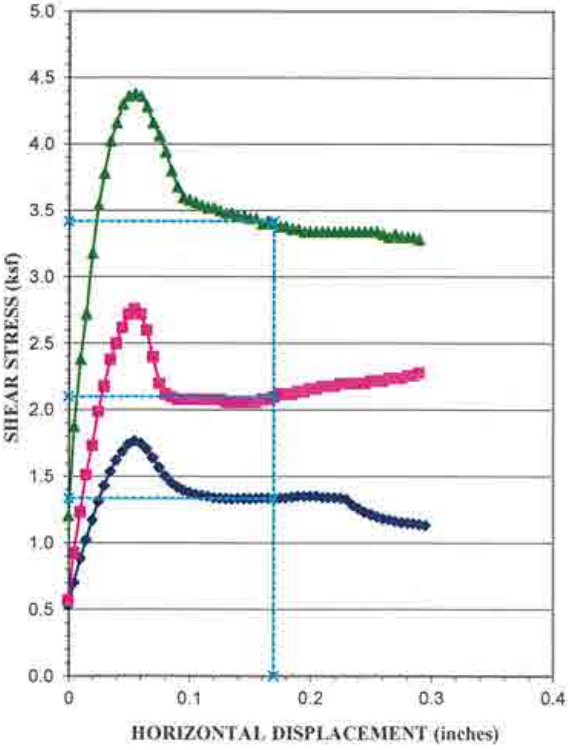


Project:	One O'clock Hill - Geotech
Location:	TP-9
Sample Depth, ft:	6½
Description:	Block
Soil Type:	Sandy Silty Clay (CL-ML)
Natural Moisture, %:	13
Dry Density, pcf:	98
Liquid Limit:	26
Plasticity Index:	4
Water Added at:	1 ksf
Percent Collapse:	0.1

PROJECT NO.: 219074	EARTHTEC ENGINEERING	**FIGURE NO.:** 14

DIRECT SHEAR TEST



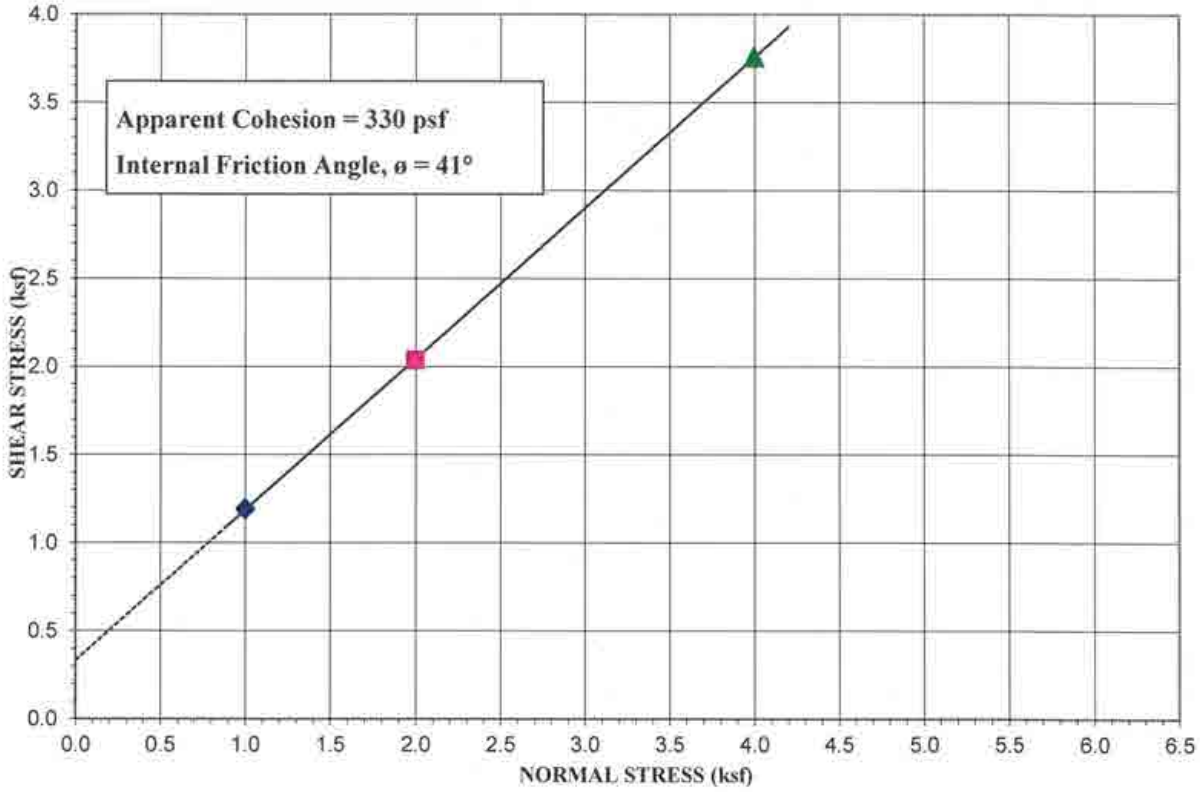


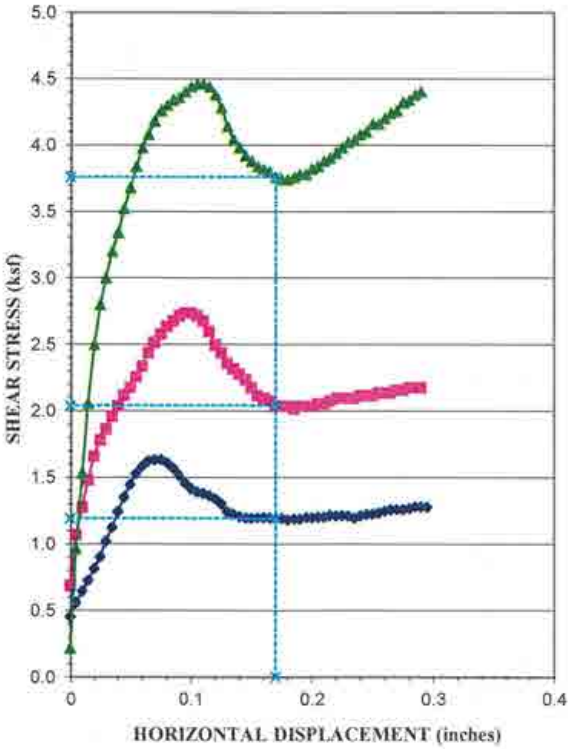
Source: TP-4	Depth: 4.5 FT		
Type of Test:	Consolidated Drained/Saturated		
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type	Remolded		
Initial Height, in.	1	1	1
Diameter, in.	2.4	2.4	2.4
Dry Density Before, pcf			
Dry Density After, pcf	120.9	122.8	120.2
Moisture % Before			
Moisture % After	13.9	14.1	13.8
Normal Load, ksf	1.0	2.0	4.0
Shear Stress, ksf	1.34	2.10	3.42
Strain Rate	.00008640 IN/SEC		
Sample Properties			
Cohesion, psf	675		
Friction Angle, ϕ	35		
Liquid Limit, %	22		
Plasticity Index, %	NP		
Percent Gravel	3		
Percent Sand	39		
Percent Passing No. 200 sieve	58		
Classification	ML		

PROJECT: One O'clock Hill - Geotech

PROJECT NO.: 219074	Earthtec Engineering	**FIGURE NO.:** 15

DIRECT SHEAR TEST





Source: TP-9	Depth: 2.5 FT		
Type of Test:	Consolidated Drained/Saturated		
Test No. (Symbol)	1 (◆)	2 (■)	3 (▲)
Sample Type	Remolded		
Initial Height, in.	1	1	1
Diameter, in.	2.4	2.4	2.4
Dry Density Before, pcf			
Dry Density After, pcf	117.0	116.1	118.0
Moisture % Before			
Moisture % After	13.8	14.3	13.8
Normal Load, ksf	1.0	2.0	4.0
Shear Stress, ksf	1.19	2.04	3.76
Strain Rate	.00008640 IN/SEC		

Sample Properties	
Cohesion, psf	330
Friction Angle, ϕ	41
Liquid Limit, %	19
Plasticity Index, %	NP
Percent Gravel	62
Percent Sand	26
Percent Passing No. 200 sieve	12
Classification	GP-GM

PROJECT: One O'clock Hill - Geotech

PROJECT NO.: 219074

Earthtec Engineering

FIGURE NO.: 16

PROJECT NO.: 219074

FIGURE NO.: 17

STABILITY RESULTS

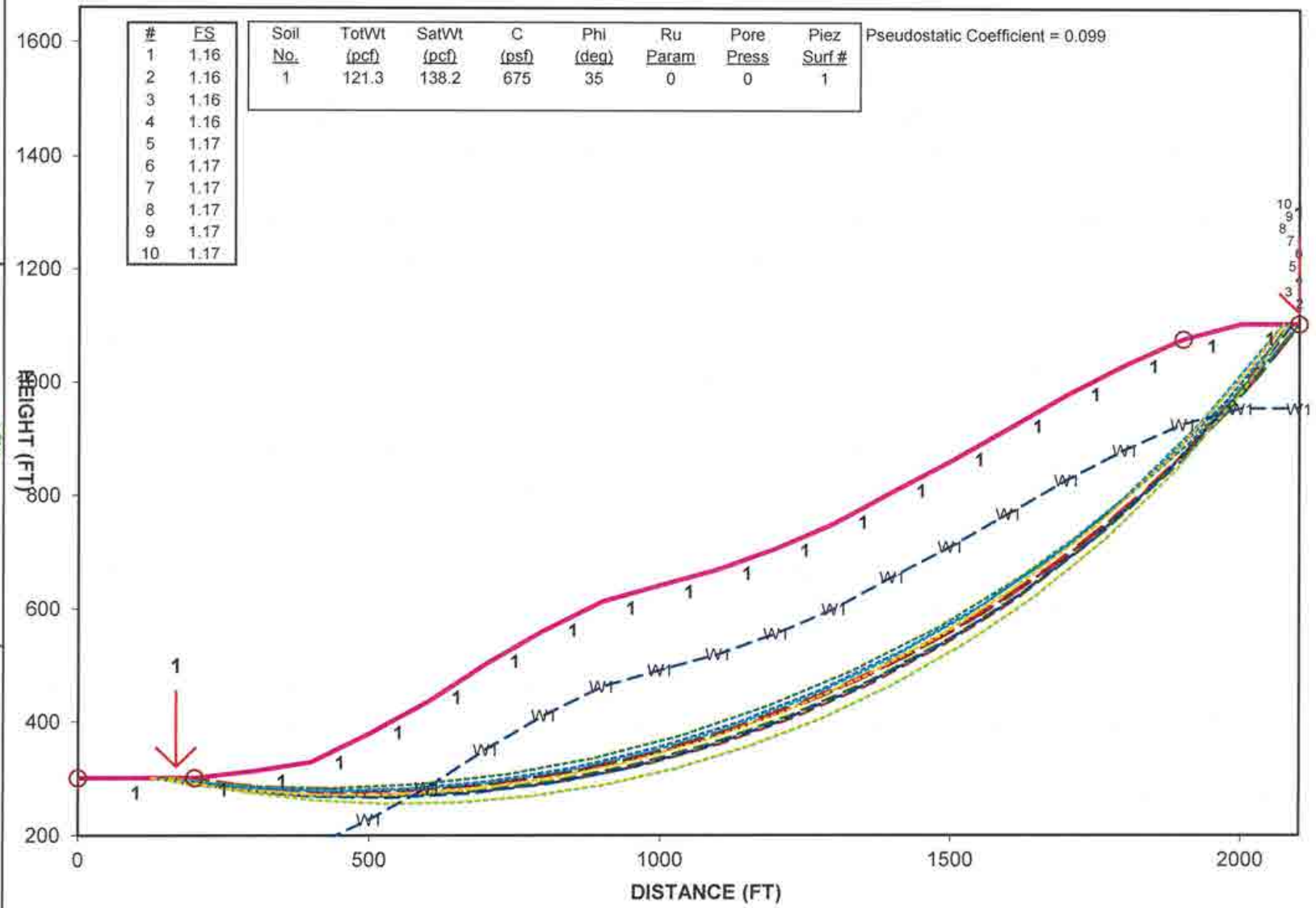
ONE O'CLOCK HILL~SEISMIC

Ten Most Critical Surfaces. 219074AS .OPT Run By: Earthtec 11-01-21

#	FS
1	1.16
2	1.16
3	1.16
4	1.16
5	1.17
6	1.17
7	1.17
8	1.17
9	1.17
10	1.17

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez Surf #
1	121.3	138.2	675	35	0	0	1

Pseudostatic Coefficient = 0.099



PROJECT NO.: 219074

FIGURE NO.: 18

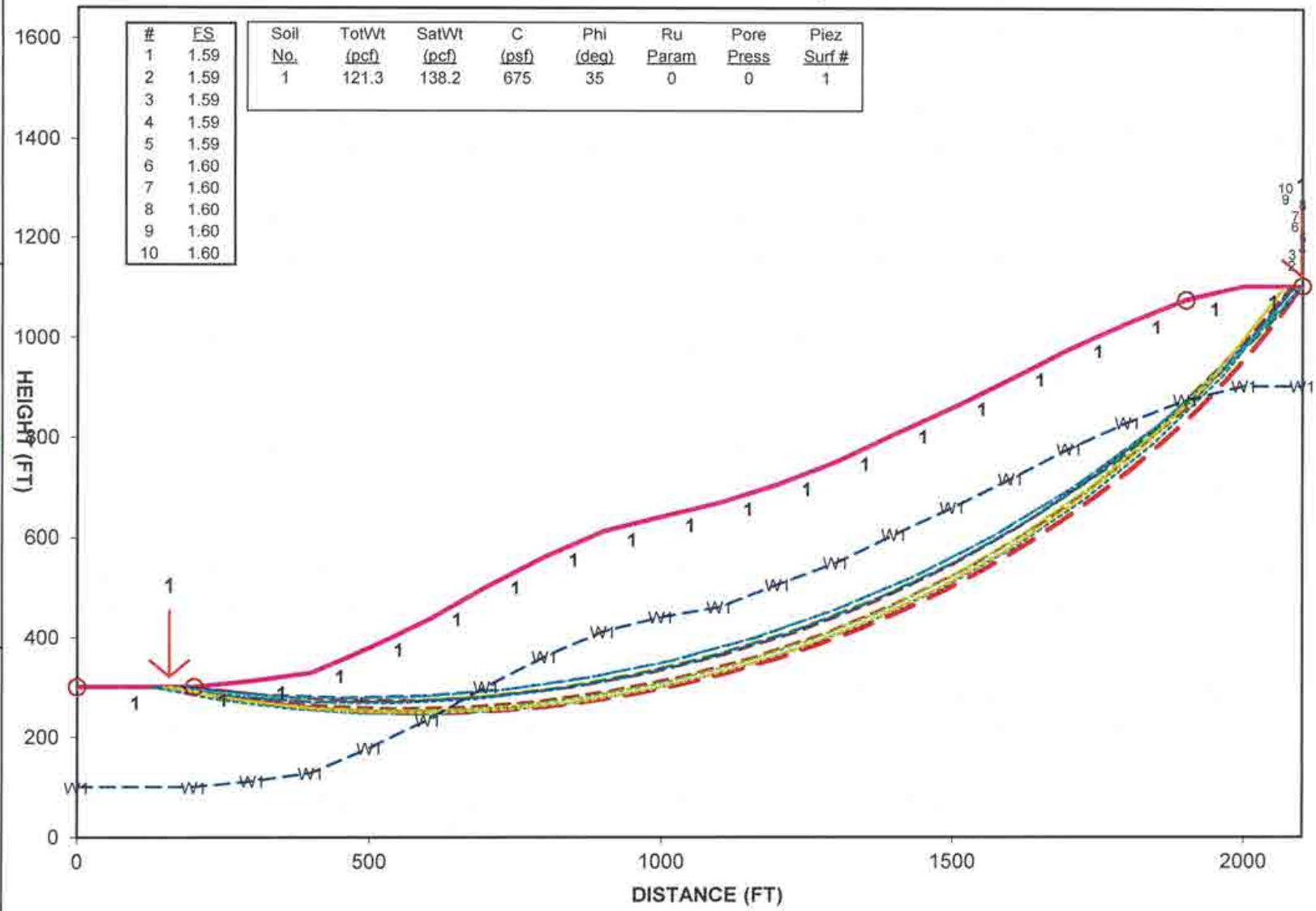
STABILITY RESULTS

ONE O'CLOCK HILL~STATIC

Ten Most Critical Surfaces. 219074AD .OPT Run By: Earthtec 10-22-21

#	FS
1	1.59
2	1.59
3	1.59
4	1.59
5	1.59
6	1.60
7	1.60
8	1.60
9	1.60
10	1.60

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez Surf #
1	121.3	138.2	675	35	0	0	1



PROJECT NO.: 219074

FIGURE NO.: 19

STABILITY RESULTS

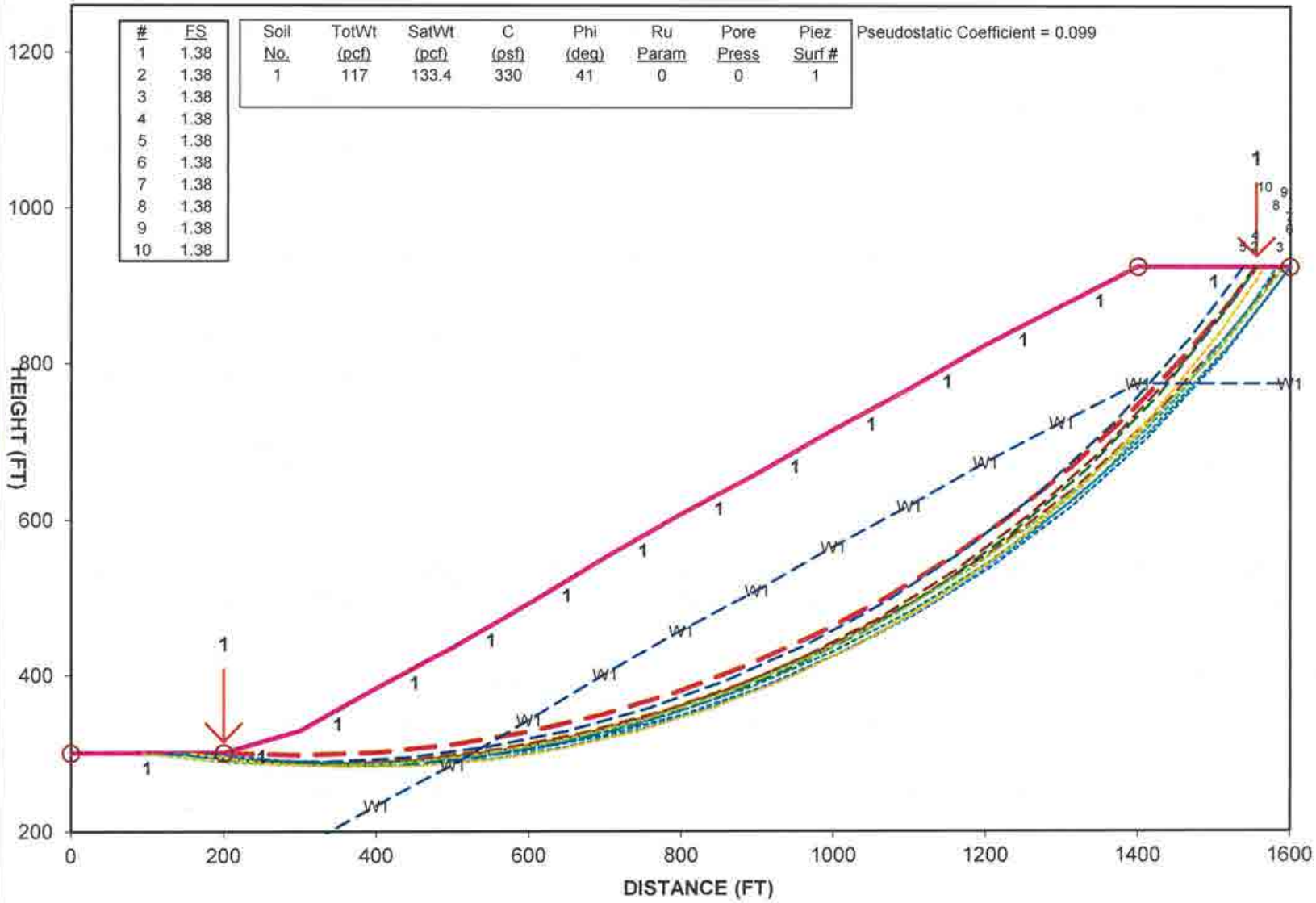
ONE O'CLOCK HILL~BB' SEISMIC

Ten Most Critical Surfaces. 219074BS .OPT Run By: Earthtec 11-01-21

#	FS
1	1.38
2	1.38
3	1.38
4	1.38
5	1.38
6	1.38
7	1.38
8	1.38
9	1.38
10	1.38

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez Surf #
1	117	133.4	330	41	0	0	1

Pseudostatic Coefficient = 0.099



PROJECT NO.: 219074

FIGURE NO.: 20

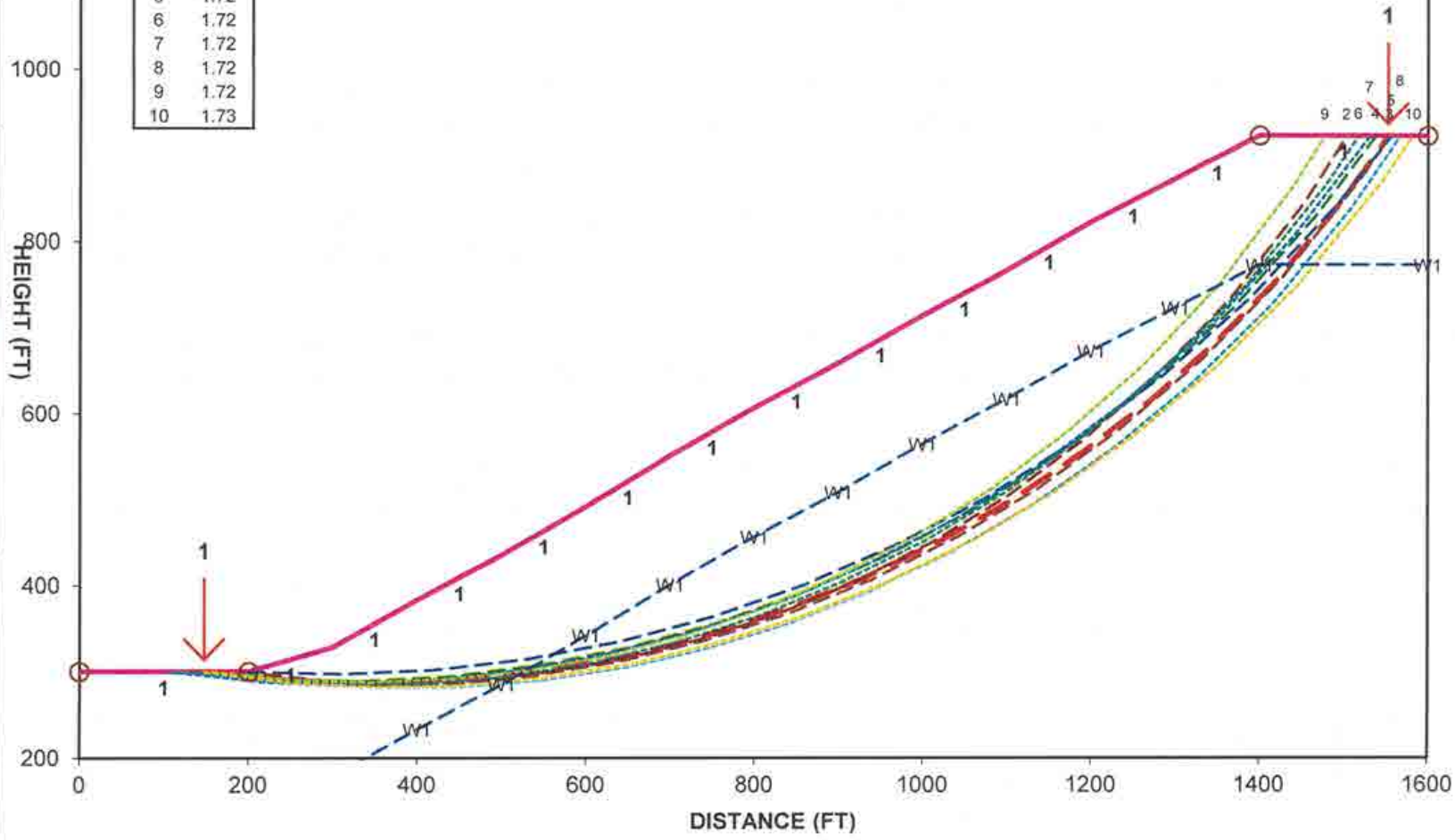
STABILITY RESULTS

ONE O'CLOCK HILL~BB' STATIC

Ten Most Critical Surfaces. 219074BD .OPT Run By: Earthtec 11-01-21

#	FS
1	1.72
2	1.72
3	1.72
4	1.72
5	1.72
6	1.72
7	1.72
8	1.72
9	1.72
10	1.73

Soil No.	TotWt (pcf)	SatWt (pcf)	C (psf)	Phi (deg)	Ru Param	Pore Press	Piez Surf #
1	117	133.4	330	41	0	0	1



APPENDIX A

Timpview Analytical Laboratories
A Chemtech-Ford, Inc. Affiliate
1384 West 130 South Orem, UT 84058 (801) 229-2282

Certificate of Analysis

Earth Tech, LLC (dba Earthtec)
Jeremy Balleck
1497 W 40 S
Lindon, UT 84042
DW System # :

Work Order #: 21I1705
PO# / Project Name: 219074
Receipt: 9/28/21 15:10
Batch Temp °C: 28.6
Date Reported: 10/5/2021

Sample Name: 219074 TP-10 @ 2.5'
Collected: 9/22/21 15:00 **Matrix:** Solid **Collected By:** M. Schedel

Parameter	Lab ID #	Method	Analysis Date / Time	Result	Units	MRL	Flags
Sulfate, Soluble (IC)	21I1705-01	EPA 300.0	10/4/21	< 10	mg/kg dry	10	
Total Solids	21I1705-01	SM 2540G	9/30/21	97.0	%	0.1	

Comment: One OClock Hill

Reviewed by: Joyce Applegate

Joyce Applegate, Project Manager

OSHPD

ONE O'CLOCK HILL - GEOTECH

Latitude, Longitude: 40.512663, -112.310694

Date	10/14/2021, 9:43:59 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	0.709	MCE_R ground motion. (for 0.2 second period)
S_1	0.257	MCE_R ground motion. (for 1.0s period)
S_{MS}	0.874	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.583	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.233	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.299	MCE_G peak ground acceleration
F_{PGA}	1.301	Site amplification factor at PGA
PGA_M	0.389	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	0.709	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	0.762	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.67	Factored deterministic acceleration value. (0.2 second)
S1RT	0.257	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.276	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.175	Factored deterministic acceleration value. (1.0 second)
PGAd	1.032	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.93	Mapped value of the risk coefficient at short periods
C_{R1}	0.933	Mapped value of the risk coefficient at a period of 1 s

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840 West 1700 South #10
Salt Lake City, Utah - 84104
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

SURFACE FAULT RUPTURE HAZARDS STUDY ONE O'CLOCK HILL UT-36 AND SETTLEMENT CANYON ROAD TOOELE, UTAH

Project No. 219075

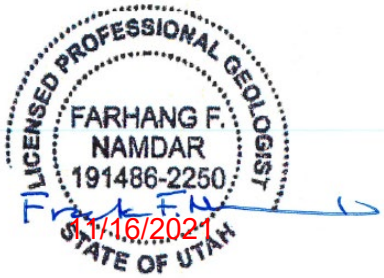
November 12, 2021

Prepared For:

Tooele 90 LLC
Attention: Mr. Shaun Johnson
6975 Union Park Ave., Ste 600
Cottonwood Heights, UT 84047

Prepared By:

EARTHTEC ENGINEERING
Lindon Office



Frank Namdar, P.G., E.I.T.
Geologist

Michael S. Schedel
Staff Geologist

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APPENDIX A

Statement of Qualification

1.0 INTRODUCTION

This report presents the results of a surface fault rupture hazards study for the subject site located in Tooele, Utah. We understand that a new residential subdivision is planned for construction on the site. The location of the subject site with respect to existing roadways is shown on Figure No. 1, *Vicinity Map*, at the end of this report.

The purposes of this investigation were to assess surface fault rupture and related hazards at the site and to provide recommendations for minimizing fault rupture hazards as warranted. The scope of work completed for this investigation included field reconnaissance, subsurface investigation (trenching), geologic analysis, and the preparation of this report in accordance with the Tooele City Zoning, General Plan & Master Plan Map Amendment Application Packet.

2.0 PROPOSED CONSTRUCTION & SCOPE OF WORK

We understand that the proposed project, as described to us by Mr. Shaun Johnson, consists of developing the approximately 38-acre existing group of parcels with the construction of a new residential subdivision. The proposed structures will consist of conventionally framed, one- to two-story, houses with basements. In addition, we anticipate that utilities will be installed to service the proposed buildings, exterior concrete flatwork will be placed in the form of curb, gutter, sidewalks, and residential streets will be constructed.

In addition to the geotechnical report prepared by Earthtec Engineering, a surface fault rupture hazard study is necessary to assess the potential for fault hazards in the area. According to published USGS geologic maps, a segment of the Oquirrh Fault Zone runs beneath or adjacent to the subject site. The purpose of this report and the field work conducted is to locate any fault traces related to the mapped fault and provide recommendations for hazard mitigation as it would pertain to fault hazards.

3.0 SITE CONDITIONS

At the time of our subsurface exploration the site consisted of three undeveloped parcels vegetated with native grasses, patches of small trees, and sagebrush. Large power line poles run northeast-southwest throughout the property, and a pump house is built on the northern section against the mountain slope with an asphalt driveway leading to it. An emergency two-track road exists running along the central run of powerlines and does not appear to be regularly maintained, according to local residents near the south end of the property. The entire property is fenced off, and the southern section is used as a horse pasture. The ground surface appears to be relatively flat past the edge of the mountain slopes. The lot was bounded on the northwest by UT-36 Highway, on the southeast by open mountainous land, on the southwest by open field, and on the northeast by Settlement Canyon Road.

4.0 GEOLOGIC AND TECTONIC SETTING

The subject property is located in the southeastern portion of Tooele Valley near the western slope of the Oquirrh Mountains. Tooele Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province. The valley was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. The valley is bordered by the Oquirrh Mountains on the east and the Stansbury Mountains on the west. Much of northwestern Utah, including Tooele Valley, was previously covered by the Pleistocene age Lake Bonneville. The Great Salt Lake, which borders Tooele Valley to the north, is a remnant of this ancient fresh-water lake

The Oquirrh Fault Zone is considered to be an "active" fault zone. An active fault zone is defined as one that has shown evidence of displacement during Holocene time (the past 10,000 years). The Oquirrh Fault Zone is a generally north-trending normal fault along the western base of the Oquirrh Mountains. The Oquirrh Mountains are the easternmost and highest of three distinctive north-south mountain ranges in the Basin and Range west of the high central part of the Wasatch Range. Surficial geology in Tooele Valley to the west is dominated by lake deposits and alluvium. Several buried faults that do not cut surficial deposits are postulated in the vicinity of the Oquirrh fault zone which may be older and not related to the fault zone. One such fault, the Occidental fault, may have been reactivated by Oquirrh fault zone activity (Solomon, 1996)[1].

In addition to the Oquirrh Fault Zone, the area has also been influenced geologically by Lake Bonneville, an ancient fresh-water lake which formerly covered the valleys of western Utah. The shoreline of the lake reached a maximum elevation of approximately 5,180 feet above sea level. Evidence of this shoreline, known as the Bonneville Level, and several others which formed as the lake level fluctuated or dropped, are visible at places along the foothills of the Oquirrh Mountain Range.

The surficial geology of much of the eastern margin of the valley has been mapped by Clark, et al., 2020[2]. A portion of this map, which includes the area of the subject site is attached as Figure No. 2a, *Surficial Geologic Map of the Site*. The surficial geology at the location of the subject site and adjacent properties contains the following geologic units which are mapped as "Younger fan alluvium, post-Lake Bonneville" (Map Unit Qafy), Holocene to Pleistocene "Lacustrine and alluvial deposits, undivided" (Map Unit Qla), "Colluvium and talus, Holocene to upper Pleistocene" (Map Unit Qmct), middle- to upper-Pleistocene "Older fan alluvium, pre-Lake Bonneville" (Map Unit Qafo), and "Oquirrh Group, Bingham Mine Formation. The bed rock units of the site area are upper member" (Map Unit IPobmu) dated from the upper Pennsylvanian, late to middle Eocene "Quartz latite porphyry dikes and sills" (Map Unit

[1] Black, B.D., McDonald, G.N., and Hecker, S., 1999, 2398 Oquirrh Fault Zone
[2] Clark, D.L., Oviatt, C.G., Dinter, D.A., 2020, Geologic Map of the Tooele 30'x60' Quadrangle*, Tooele, Salt Lake, and Davis Counties, Utah*; Utah Geological Survey, Open-File 284DM, Scale 1: 62,500.

Tiqlp), and Upper Pennsylvanian "Oquirrh Group, Bingham Mine Formation" (Map Unit IPobmu). These soil or deposits are described below:

Qafy **Younger fan alluvium, post-Lake Bonneville (Holocene to uppermost Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; deposited by streams, debris flows, and flash floods on alluvial fans and in mountain valleys; merges with unit Qal; includes alluvium and colluvium in canyon and mountain valleys; may include areas of eolian deposits and lacustrine fine-grained deposits below the Bonneville shoreline; includes active and inactive fans younger than Lake Bonneville, but may also include some older deposits above the Bonneville shoreline.

Qmct **Colluvium and talus (Holocene to upper Pleistocene)** – Local accumulations of mixed colluvium and talus throughout the map area; common near Lake Bonneville shorelines; thickness up to 15 feet (5 m).

Qla **Lacustrine and alluvial deposits, undivided (Holocene to upper Pleistocene**) – Sand, gravel, silt, and clay; consist of alluvial deposits reworked by lakes, lacustrine deposits reworked by streams and slopewash, and alluvial and lacustrine deposits that cannot be readily differentiated at map scale.

Qafo **Older fan alluvium, pre-Lake Bonneville (upper to middle? Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; similar to unit Qafy, but forms higher level incised deposits that predate Lake Bonneville; includes fan surfaces of different levels; fans are incised by younger alluvial deposits and locally etched by Lake Bonneville.

Tiqlp **Quartz latite porphyry dikes and sills (late to middle Eocene)** – Medium-brown and light-greenishgray, hornblende-biotite quartz latite porphyry; hornblende is altered to phlogopite and/or chlorite within the Bingham pit area; distinguished from other latitic dikes and sills by the presence of relatively large quartz phenocrysts and higher percentage of aphanitic groundmass; groundmass usually contains considerable hornblende (KUCC, 2009); includes Raddatz porphyry dikes with large K-feldspar phenocrysts (Settlement Canyon area) (see Krahulec, 2005; new geochemical data in Clark and Biek, 2017), and the Andy Dike and apophyses at Bingham mine (KUCC, 2009); 40Ar/39Ar ages of 37.66 ± 0.08 and 37.72 ± 0.09 Ma (Deino and Keith, 1997), and U-Pb zircon age of 37.97 ± 0.11 Ma (von Quadt and others, 2011); also forms some small dikes (unmapped) east of Pass Canyon and near North Oquirrh thrust (Swensen and others, 1991) with K-Ar age of 36.5 ± 1.1 Ma (Moore, 1973); Raddatz dike has 40Ar/39Ar age of 39.4 ± 0.34 Ma (Kennecott in Krahulec, 2005).

IPobmu Oquirrh Group, Bingham Mine Formation, upper member (Upper Pennsylvanian, Virgilian-Missourian) – Light gray to tan, thinly color-banded and locally cross-bedded quartzite with interbedded thin, light- to medium-gray calcareous, fine-grained sandstone, limestone, and siltstone.

Clark & Others (2020) also mapped surface fault rupture segments within the Oquirrh Fault Zone. This implied fault rupture segment is shown on Figure No. 2 as dotted lines with the rod and ball pattern on the down-thrown side of the fault. As shown on Figure No. 2, the fault consists of a single southwest to northeast running implied fault trace which runs parallel to UT-36 at a distance of approximately 150 to 200 feet from the west boundary of the site. This implied fault trace is the only known fault trace in the vicinity and is mapped by Clark & Others (2020). According to the map, the exact location of the fault trace is not known, as no other contiguous line of this splay is mapped. This is extrapolated based on continuous geologic units and the orientation of the mapped normal fault in that area. Another map at Utah Geological Survey (UGS) website shows approximately located normal faults as continuances of the splay within the Oquirrh Fault Zone as close as 100 feet due southeast of the site along the base of the western slope of the Oquirrh Mountains. However, since we could not find the source documentation of these faults, we contacted UGS about the source of these faults. Mr. Don Clark on a phone conversation on November 15, 2021, mentioned that the faults drawn in 1980 map by Edwin Tooker of USGS in "Preliminary Geologic Map of Tooele Quadrangle", USGS OFR 80-623, are not accurate and are not confirmed by the more recent mapping interpretations. Therefore, it is our opinion that the main fault in the area is the implied fault mapped by Clark and others located on the west of the UT-36.

Low Light angle aerial photographs of the Oquirrh Fault Zone produced from 1936 to 1952 (exact date unknown) and 1970 at the location of the subject site and surrounding areas were reviewed as part of this study. The 1936 to 1952 and 1970 aerial photographs are shown in Figure Nos. 4a and 4b, respectively. The reviewed photographs do not show visible or prominent scarps and lineaments (i.e. vegetation lineaments, gullies, vegetation/soil contrasts, aligned springs and seeps, sag ponds, aligned or disrupted drainages, grabens, and/or displaced landforms such as shorelines, geologic units, etc.) adjacent to or on the subject site or its surroundings that correlate well with mapped faults. Hence, no surficial features that might indicate past surface fault rupture and related ground deformation were discernible on the subject site. No surficial features at the location of the short fault segment mapped crossing near the south edge of the subject lot are visible in the reviewed photographs.

In addition, in reviewing a LiDAR image from the area of the site, prominent scarps are not visible on the subject site nor on the adjacent hillslopes. We couldn't clearly see the mapped faults in the LiDAR image due to surface disturbance, drainages, trails, and residential and industrial development to the west of the subject lot where the implied fault trace is mapped. The LiDAR image of the site area is shown in Figure No. 5. *LiDAR Image of the Subject Site Area*.

5.0 EXPLORATION TRENCHING

5.1 Field Methods

To observe the subsurface deposits at the location of the subject site for evidence of past surface rupture and/or other related ground deformation related to faulting, three exploration trenches were excavated on the lot on September 20, 2021 and were observed and logged on September 23, 2021. The trenches were approximately 86 to 104 feet long, stretching 40 to 70 feet southeast of UT-36 pavement, oriented at northwest-southeast. The trenches extended to maximum depths of approximately 5 to 11 feet below the existing ground surface. The location of the exploration trenches on the site are shown on Figure No. 3, *Exploration Trenches & Setback Locations*. The exploration trenches (ET-1, ET-2, and ET-3) were excavated by Blaine Hone Excavating with a CAT 308 track-mounted excavator and were back-filled upon completion of the field work. The northeast wall of each trench was logged by an experienced geologist using standard tools and techniques. A representative log of the trench wall was produced and is included at the end of this report as Figure Nos. 6-8, *Exploration Trench Logs*.

The location and extent of the exploration trench at the site was chosen to provide as much coverage for the proposed structure based on the orientation of the faults in the vicinity of the site with the excavation equipment ability in mind. The active faults (less than 10,000 years old) in the area of the site would be evident in the Lake Bonneville sediments that cover the surficial deposits at the site. Figure No. 2, *Surficial Geologic Map of the Site*, shows the location of the entire run of the implied fault trace.

5.2 Subsurface Conditions

The soils encountered during our subsurface exploration are shown on Figure Nos. 6-8, *Exploration Trench Logs*. The exploration trenches exposed up to 1½ feet of organic rich Topsoil (Unit 1) at the surface. Below Unit 1, massive sand of Lake Bonneville sediments such as Unit 2 in ET-1 and reworking of variable impacts by the lake activities such as alluvium and colluvium of variable degrees as encountered in Unit 2 in ET-2 and ET-3 and in Unit 3 in ET-1 and ET-3. Below the reworked alluvium and colluvium by Lake Bonneville ET-2 exposed weathered bedrock in Unit 3 and Lake Bonneville shoreline sand and near shore fine sediments were exposed in Unit 3A of ET1 and in Unit 4 of ET-3. The detailed unit description can be found in trench logs in Figures 6-8. The age of the sediments

exposed in trenches range from upper Pleistocene to Holocene. Bedrock exposed in ET-1 is most likely of upper Pennsylvanian in age.

No zones or planes of shearing or shifting or deformation that could be indicative of fault rupture were observed. Finer sands and silty clay of near shore Lake Bonneville were observed without any shifting along the entire trench in ET-1 and ET-3.

Based on our observations of the stratigraphic relationships of the soil units exposed in the exploration trenches, as well as the referenced geologic mapping by Clark & Others (2020) logged Unit 3 in ST-1 and Unit 4 in ET-3 are of sufficient age to have recorded any Holocene surface faulting events at the site. No evidence of fault rupture was observed in these soil units exposed in the trench. No other related tectonic or coseismic deformation was observed in the deposits exposed in the exploration trenches at the site. Absence of faulting in the exploration trench relates to the potential fault mapped in the area of the site. No faulting was observed, caused by the Implied fault, at the exploration trench location. Hence, the location of the mapped fault was not discovered at the site and the potential for the presence of the fault or its impact, if it exists, near UT-36, as mapped by Clark & Others (2020), still exists at the site. The impact of the potentially active fault to the structures during an earthquake could however be significant and could cause structural failure.

6.0 SUMMARY OF SURFACE FAULT RUPURE AND RELATED HAZARDS

6.1 Surface Fault Rupture

As discussed in the previous section, no evidence of past surface fault rupture was observed in the exposed deposits of the exploration trenches. The reworked alluvium and lacustrine sand and gravel deposits, and finer Lake Bonneville sediments observed in the trenches are deposits of upper Pleistocene to Holocene in age. Therefore, the exposed deposits are of sufficient age to show Holocene age (active) fault displacement.

As discussed in Section 4.0, implied fault trace has been mapped by Clark & Others (2020) on the Geologic Map of the Tooele Quadrangle near the northwest boundary of the subject lot (Figure No. 2). A LiDAR image of the area of the site was reviewed. An abrupt change of elevation, typically shown in LiDAR images by dark areas, can show location of faults as ground shifting, was not observed. The LiDAR image is shown in Figure No. 5, *LIDAR Image of the Subject Site Area*. The approximate location of the mapped fault is also shown on Figure No. 2, *Surficial Geologic Map of Site*. There are no significant surficial features, other than the ones noted above, on the site that would suggest the presence of the fault near the site, however, such features may have been erased by past development activities or erosion. Based on current guidelines for evaluating surface fault rupture hazards in Utah (Christenson et. al, 2003), it is our opinion that a minimum building setback from the southwest edge of the paved UT-36 road of 91.6 feet, 64.6 feet, 61.6 feet at the location of trench ET-1, ET-2, ET-3, respectively, would be conservatively appropriate. These distances

were calculated by assuming 21.6-foot setback from the northwest end of each trench as shown on Figure No. 3.

According to Bowman and Lund (2016), Chapter 3 Guidelines for Evaluating Surface-Fault-Rupture Hazards in Utah, Fault Setback section, provides the following definition the for variable D to be used in the setback calculation formula: "D = Expected maximum fault displacement per earthquake (maximum vertical displacement) (feet) to be used in the fault setback formula." Bowman and Lund (2016) also states: "Fault displacement is the maximum vertical displacement measured for an individual surface-faulting earthquake at the site (not necessarily the displacement of the most recent surface-faulting event). If a range of displacements is possible (e.g., because of uncertainty in how geologic layers or contacts are correlated or projected into the fault zone), the largest possible displacement value should be used. If per-earthquake displacements cannot be measured on site, the maximum displacement based on paleoseismic data from nearby paleoseismic investigations on the fault or segment may be used. In the absence of nearby data, consult DuRoss (2008) and DuRoss and Hylland (2015) for the range of displacements measured on the central segments of the Wasatch fault zone. Lund (2005) reports limited displacement information for some other Utah Quaternary faults."

Measured net vertical displacement by Susan Olig, et al. (1996)[3] for the Oquirrh Mountain normal fault was 2.2 meter (7.2 feet). A study was also performed by researchers (Morey 1998) at the University of Utah that conducted a 3-D seismic experiment across the Oquirrh fault and was printed at Geophysical Journal International, Volume 138, Issue 1, July 1999, Pages 25–35: "Palaeoseismicity of the Oquirrh fault, Utah from shallow seismic tomography". It concluded that the maximum displacement was 2.04 meters (6.7 feet) by measuring the colluvial wedge to determine the displacement by the fault. As such, it is assumed that the fault is located beyond the southwestern end of the trenches near the southwestern property line. Based on current guidelines for evaluating surface fault rupture hazards in Utah (Christenson and others, 2003) and studies referenced above by Olig (1996, 1999) calculated minimum building setback from the southwestern end of the exploration trenches ET-1, ET-2, and ET-3 of 21.6 feet would be conservatively appropriate. As such, the fault setback distance from the southeast edge of the UT-36 road pavement is located at 91.6 feet, 64.6 feet, and 61.6 feet, at the location of trenches ET-1, EY-2, and ET-3, respectively. The 21.6 feet setback distance from the northwest end of each trench is calculated using the formula below for upthrown block of the fault that applies to the subject lot, provided by Chapter 3 of "Guidelines for investigating geologic hazards and preparing engineering-geology reports, second edition, 2020, Utah Geological Survey Circular 128,":

[3] Olig S.S. Lund W.R. Black B.D. Mayes B.H., 1996 Paleoseismic investigation of the Oquirrh fault zone, Tooele County, Utah, Utah Geol. Surv. Spec. Study, 88, 22– 54

Upthrown block (Footwall): Because the fault setback is measured from the portion of the building closest to the fault, whether subgrade or at grade, the dip of the fault and depth of the subgrade portion of the structure are irrelevant in calculating the fault setback on the upthrown block. The fault setback for the upthrown side of the fault is calculated as:

$$S = U * (2D)$$

S = Fault setback distance within which buildings are not permitted (feet) = 21.6 ft
U = Criticality factor, based on IBC Risk Category (Table 13) = 1.5
D = Expected maximum fault displacement per earthquake (maximum vertical displacement) (feet) = 7.2 ft

A 21.6-foot setback from the southwestern end of each trench is shown on Figure No. 3, *Exploration Trench & Setback Locations*. A buildable area for development is also established by connecting the setback locations, as determined at each trench.

Surface fault rupturing during large magnitude earthquake events generally occurs along existing fault rupture planes. Although it does not appear that any existing faults cross through the subject site at the trench locations, there is always some inherent potential for new surface ruptures to form during future earthquake events in the Fault Zone. Performing a surface-faulting investigation and adherence to the investigation recommendations in these guidelines does not guarantee safety (Lund 2020, c-128). Significant uncertainty often remains due to limited paleoseismic data related to the practical limitations of conducting such investigations (epistemic uncertainty), and natural variability in the location, recurrence, and displacement of successive surface-faulting earthquakes (aleatory variability). Aleatory variability in fault behavior cannot be reduced; therefore, predicting exactly when, where, and how much ground rupture will occur during future surface-faulting earthquakes is not possible. New faults may form, existing faults may propagate beyond their present lengths, elapsed time between individual surface-faulting earthquakes can vary by hundreds or thousands of years and be affected by clustering, triggering, and multi- or partial-segment ruptures.

For those reasons, developing property in the vicinity of hazardous faults will always involve a level of irreducible, inherent risk. Damage to the structures from the vibratory component of ground shaking has typically been considered separately from structural loads resulting from permanent ground deformation in studies of earthquake impacts to structures. Lightly loaded foundations have rotated and developed a large "gap" underneath the foundation due to fault offset in the past and a wider foundation caused the fault movement to be spread throughout the structure and prevented significant fault diversion. A flexible foundation caused less fault diversion to occur (Oettle 2013). In a large earthquake due to nearby faults, a range of scenarios from a catastrophic failure to potential damages

discussed above are possible for the houses and its occupants if on or offset from the fault location. Small deformation along a nearby fault may cause cracks in walls and basement floors.

6.2 Tectonic and Coseismic Deformation

In addition to ground deformation caused by surface fault rupture during a large magnitude earthquake event, other forms of tectonic and/or coseismic ground deformation can occur, especially within the fault zone. These types of deformation can include ground tilting, cracking, soil liquefaction, lateral spreading, subsidence, and slope failure. Based on our field observations as well as the reference geologic mapping reviewed for this study, there is a primary fault located to the northwest of the subject lot along the UT-36 road, as such, ground tilting and other coseismic deformation could impact the subject lot during future earthquake events.

We also recommend that the site-specific seismic design parameters be carefully be implemented in all new construction at the site per recommendations in the related geotechnical study conducted by Earthtec Engineering on the subject lot.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on our observations and analyses, the area appears to be suitable for the planned construction from a surface fault rupture hazards perspective, provided the recommendations presented in this report are carefully followed and implemented. We recommend observing all footing excavations prior to installing the concrete footing forms, to verify that no surface rupture faults are located below the planned foundation expansion prior to construction.

As mentioned before, a potentially active fault in a roughly southeast-northwest orientation is mapped parallel to the UT-36 road at southwestern boundary of the lot. However, this fault is currently not in the area of development at the lot. The impact of this fault on the proposed improvement during an earthquake is relatively low.

It must also be understood that the site is located in a geologically/seismically sensitive area where there are inherent risks associated with development. The conclusions and recommendations presented in this report are intended to provide a factor of safety against surface fault rupture and related tectonic and seismic hazards sufficient to reduce the risk to human life. However, potential structural damage due to these natural hazards at the site cannot be totally mitigated due to the limitations and inherent level of uncertainty associated with analyzing and predicting such hazards. Therefore, by choosing to build and/or reside on the subject site, the property owners and/or residents should understand and accept the inherent risks associated with building and living in a geologically and seismically sensitive area.

8.0 LIMITATIONS

A significant limitation in this study precluded the exploration trenches to extend further southwest beyond their final points, as it would have extended into marked utility trenches and into the adjoining road. Also, trench ET-2 could not be excavated deeper due to presence of bedrock. The analysis and recommendations submitted in this report are based on the data obtained from the observation at the site and compilation of known geologic information. This information and the conclusions of this report should not be interpolated to adjacent properties without additional site-specific information. The study was prepared in accordance with the approved scope of work outlined in our proposal for the use and benefit of the Client and the information in this study may not be used by other person or entity without express written permission of Client.

9.0 GENERAL CONDITIONS

The exploratory observations and data presented in this report were collected to provide surface fault rupture hazards analysis for this project. The exploration trench may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the exploration trench may occur which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, please advise us so that the appropriate modifications can be made.

The surface fault rupture hazards study as presented in this report was conducted within the limits prescribed by our client and an approved scope of work, with the usual thoroughness and competence of the engineering geology profession in the area. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts or reports.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

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VICINITY MAP

ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH

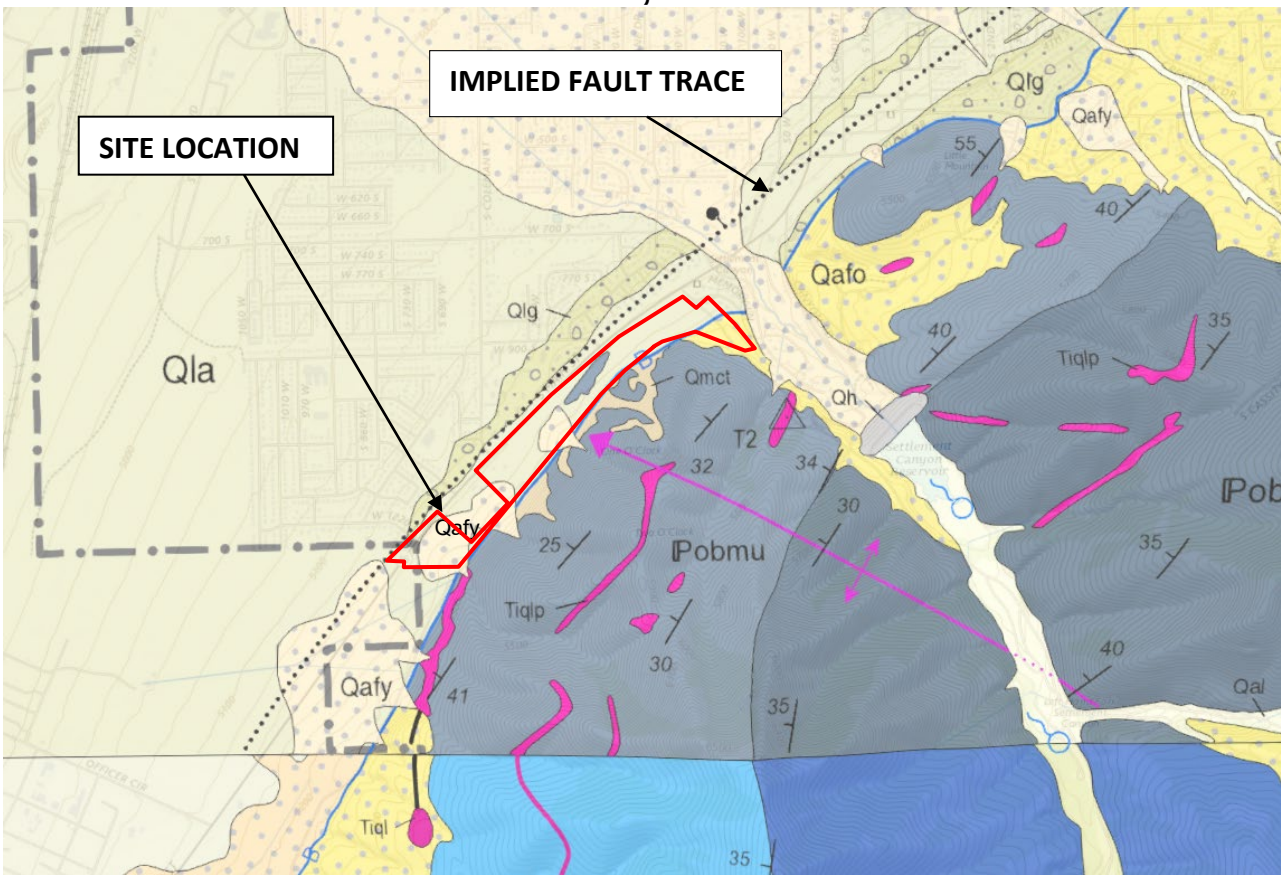
N

Not to Scale

PROJECT NO.: 219075		FIGURE NO.: 1

SURFICIAL GEOLOGIC MAP OF THE SITE

ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Geologic Map of the Tooele 30'x60' Quadrangle*, Tooele, Salt Lake, and Davis Counties, Utah*; Utah Geological Survey
Open-File 284DM, Scale 1: 62,500
By
Clark, D.L., Oviatt, C.G., Dinter, D.A., 2020

1 inch = 2200 feet

N

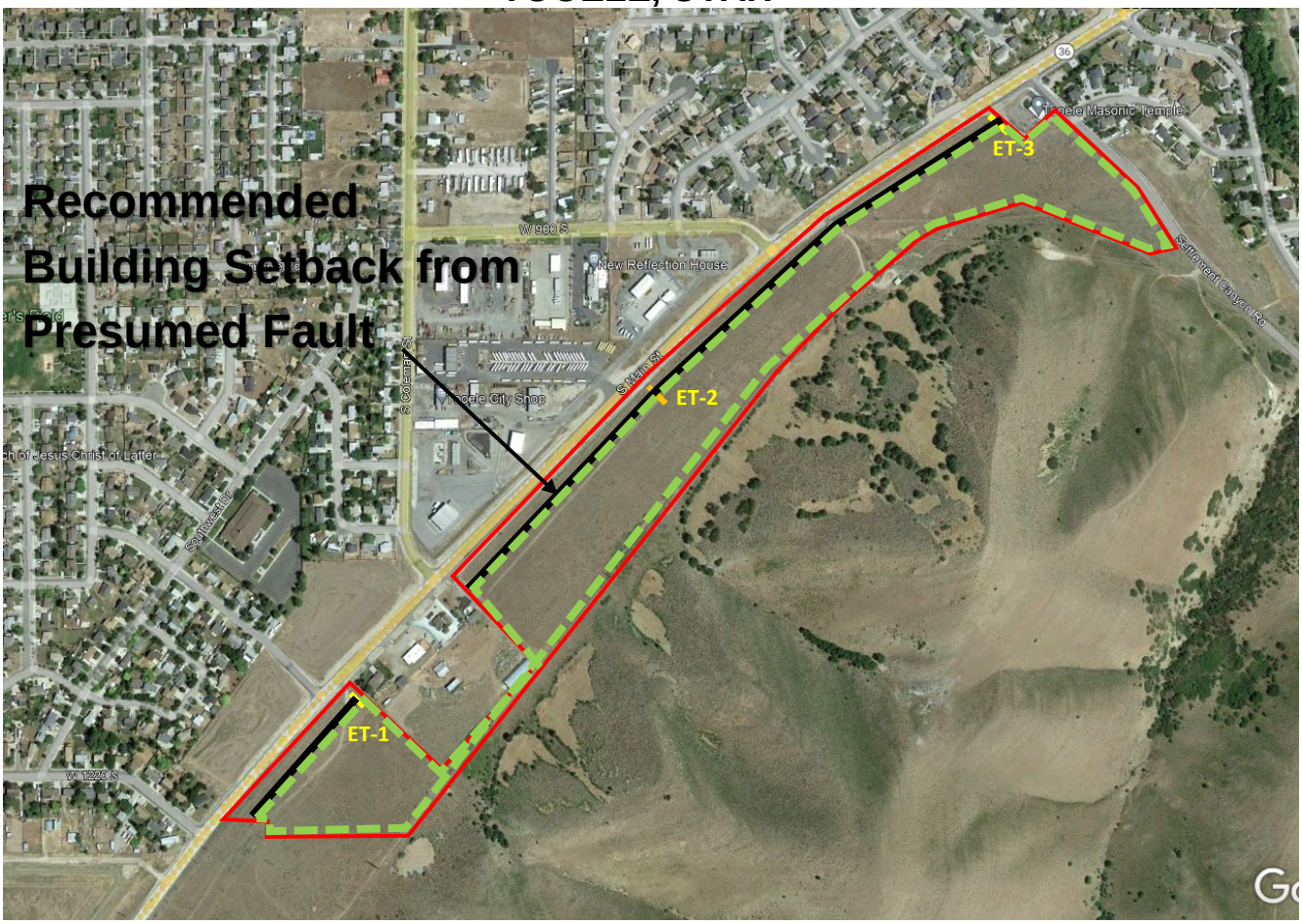
*Refer to text portion of the report for geologic unit's description

Normal Fault with Ball on the Downthrown Side

PROJECT NO.: 219075		**FIGURE NO.:** 2

AERIAL PHOTOGRAPH SHOWING LOCATION OF FAULT RUPTURE HAZARD STUDY TRENCHES ET-1, 2, 3, FAULT SET BACK

ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



*Aerial Photo by Google

Scale: 1 inch = 830 Feet

Subject Lot Boundaries

Fault Rupture Hazard Study Trenches

Buildable Area

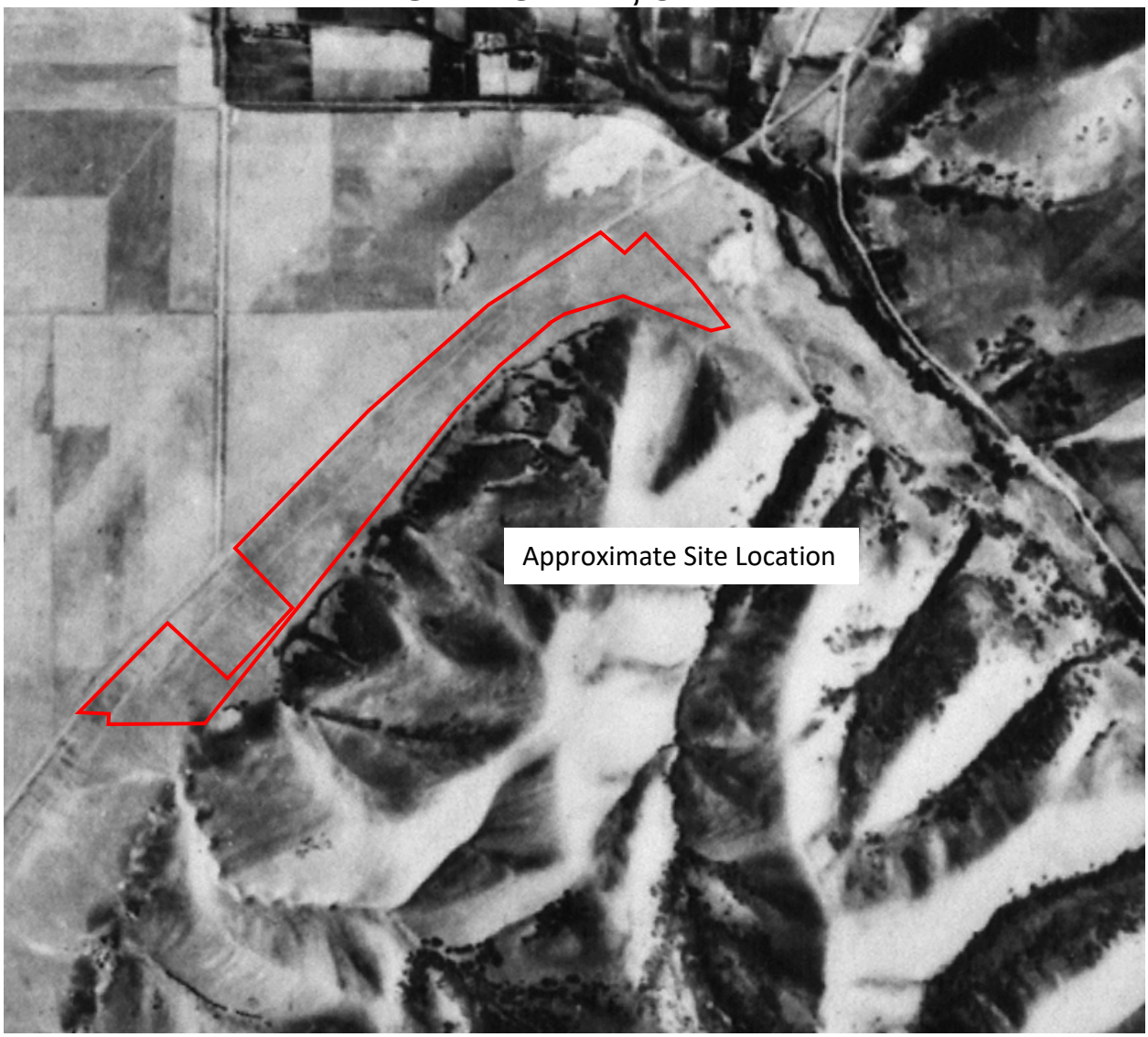
Set Back Line

N

PROJECT NO.: 219075		FIGURE NO.: 3

1936 TO 1952 AERIAL PHOTOGRAPH

ONE O'CLOCK HILL - FRHS
1825 EAST CENTER STREET
SPRINGVILLE, UTAH



Name: SCS Scanned Historical Aerial Photographs from 1936 to 1952
Resolution: UNK
Scale: UNK
Source: UGS Scan

N

Not to Scale

PROJECT NO.: 219075		**FIGURE NO.:** 4a

1970's AERIAL PHOTOGRAPH

ONE O'CLOCK HILL - FRHS
1825 EAST CENTER STREET
SPRINGVILLE, UTAH

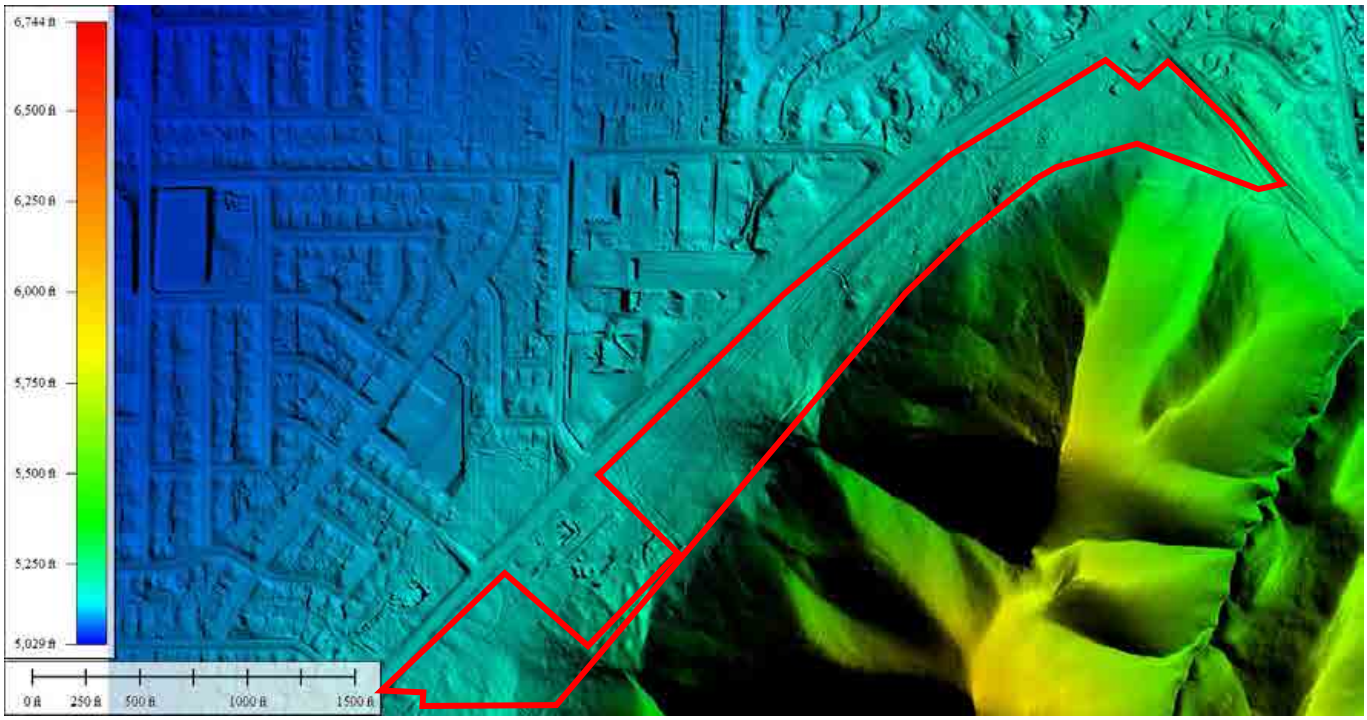
Name: 1 Meter RGB & CIR Digital Orthophotography from the 1970's
Resolution: 1 Meter
Scale: 1:31,760
Year Collected: 1970's
Source: UGS Scan
Note: Stitched together from two photos

N

Not to Scale

PROJECT NO.: 219075		**FIGURE NO.:** 4b

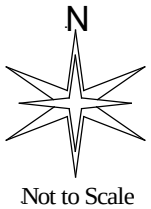
LIDAR IMAGE OF THE SUBJECT SITE AREA
LOT 29 SPRING OAKS - FRHS
1825 EAST CENTER STREET
SPRINGVILLE, UTAH



*Utah AGRC 1 Meter Bare Earth LiDAR DEM / DTM

Scale: 1 inch = 270 feet

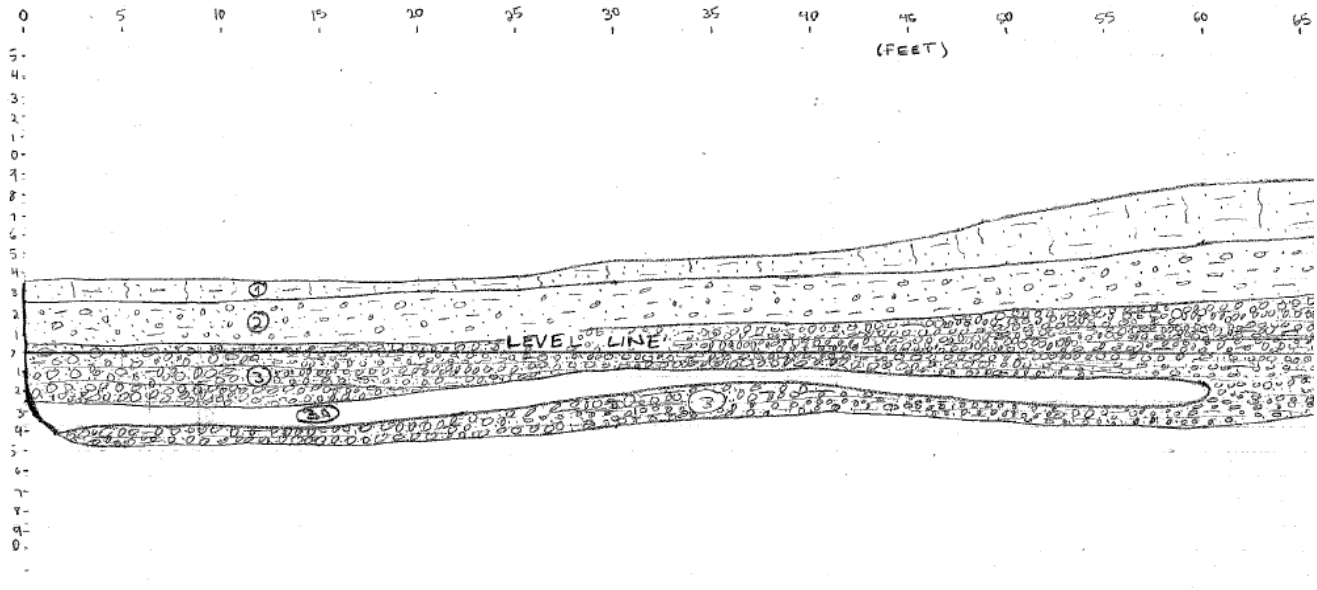
Site Location



Not to Scale

PROJECT NO.: 219026	Earthtec Engineering	**FIGURE NO.: 5**

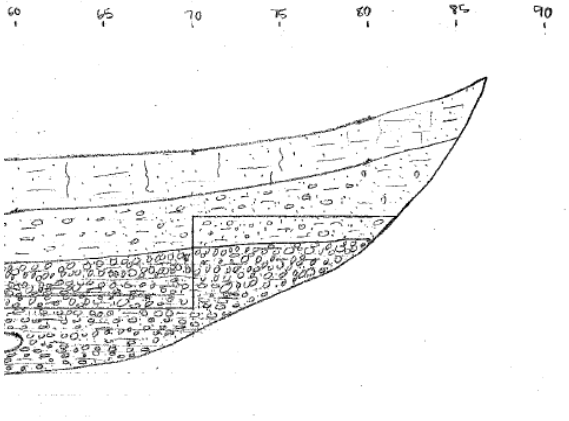
EXPLORATION TRENCH ET-1 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N308°E

PROJECT NO.: 219075	Earthtec Engineering	FIGURE NO.: 6a

EXPLORATION TRENCH ET-1 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N308°E

PROJECT NO.: 219075	Earthtec Engineering	**FIGURE NO.: 6b**

EXPLORATION TRENCH ET-1 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND STTLEMENT CANYON ROAD
TOOELE, UTAH

Unit Descriptions

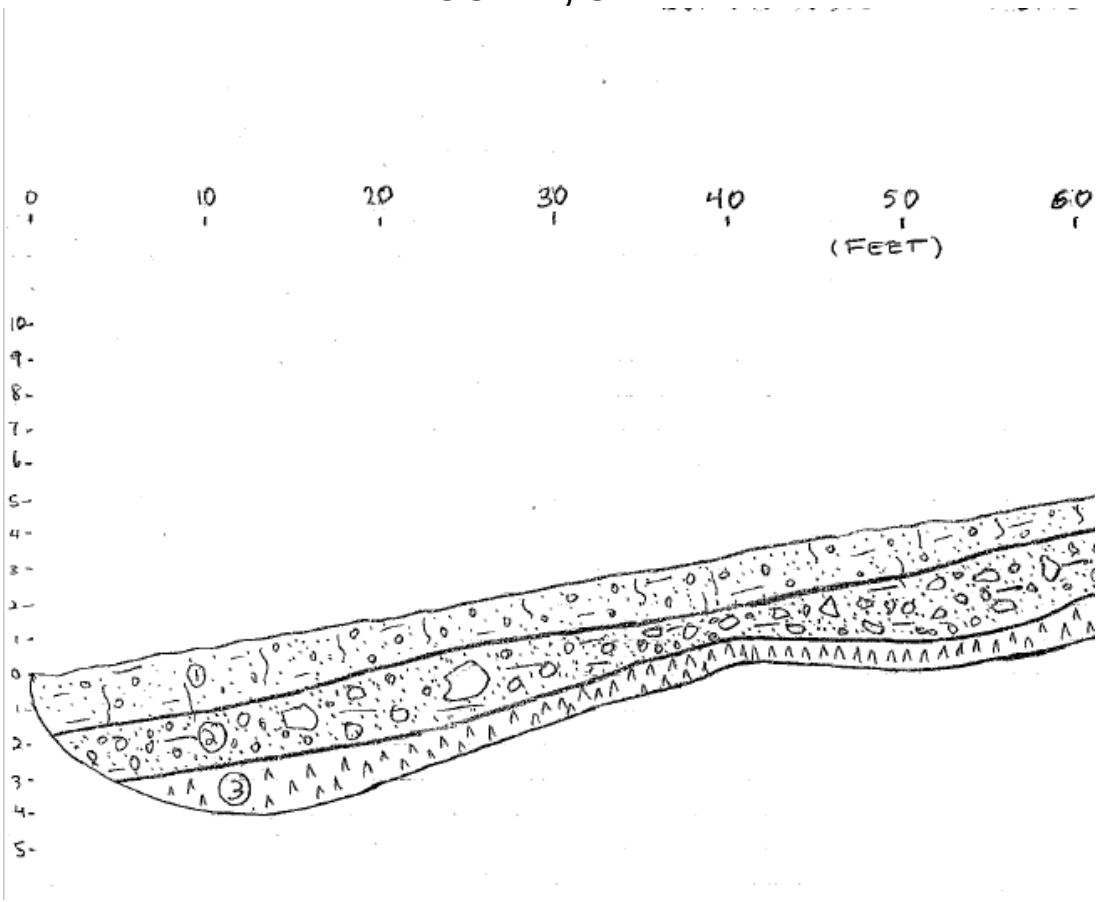
1) **Soil horizon A** – silty sand, brown, roots and organics, pinholes, low moisture

2) **Lake Bonneville Shoreline sand** – silty sand with gravel (SM), massive, sand matrix, 15% to 20% subangular to subrounded gravel, fine to coarse gravel, linear and mild calcite mottling, some roots diminished with depth, light brown to brown, very low moisture, poorly to moderately sorted, pinholes in fine sand pockets

3) **Alluvium Reworked by Lake Bonneville**– poorly graded gravel with silt and sand (GP-GM), massive, gravel matrix, laminar, very fine to coarse, subrounded to rounded gravel, fine to coarse sand, moderately to well sorted, tan to light brown, very low moisture

3A) **Lake Bonneville Near Shore** – poorly graded sand (SP), near shore very fine to fine sand, low energy environment, very well sorted, some ripple marks

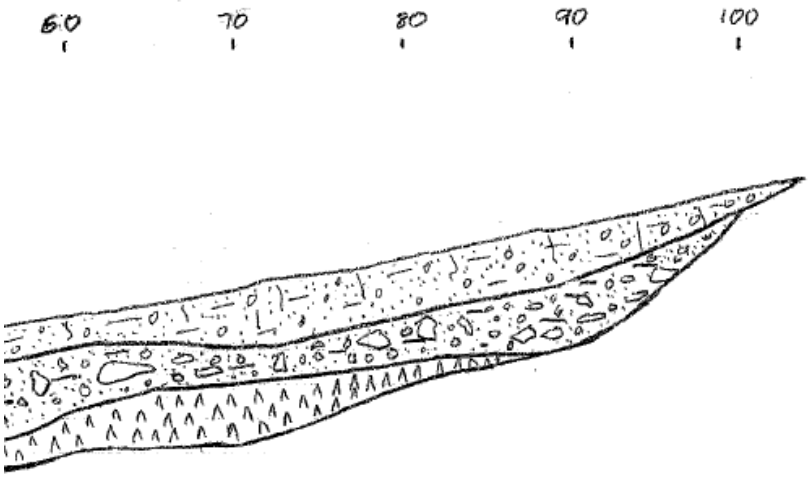
EXPLORATION TRENCH ET-2 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N326°E

PROJECT NO.: 219075	Earthtec Engineering	FIGURE NO.: 7a

EXPLORATION TRENCH ET-2 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N326°E

PROJECT NO.: 219075	Earthtec Engineering	FIGURE NO.: 7b

EXPLORATION TRENCH ET-2 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND STTLEMENT CANYON ROAD
TOOELE, UTAH

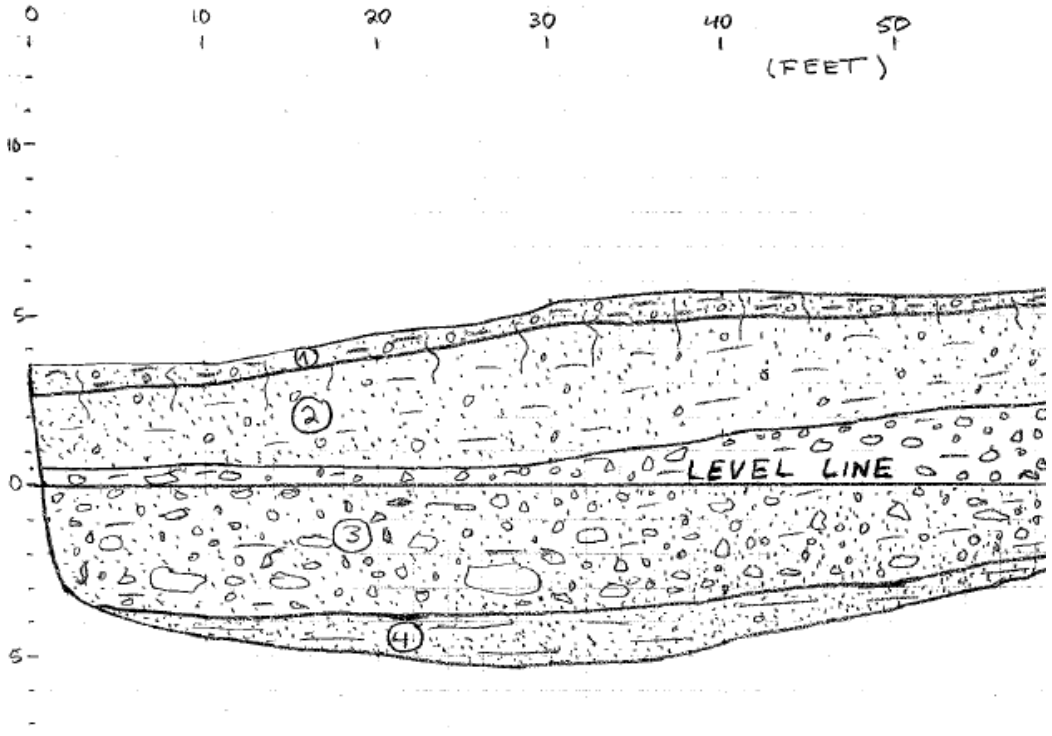
Unit Descriptions

1) **Soil horizon A** – silty sand with gravel, dark brown, roots and organics, pinholes, low moisture

2) **Colluvium** – poorly graded with gravel with sand, silt, cobble and boulder (GM), massive, medium to very coarse, subangular to subrounded gravel, massive, poorly sorted, approximately 75% clast, 25% soil, gravel and cobbles are mostly quartzite, some limestone, light brown to brown, roots diminishing with depth.

3) **Weathered Bedrock** – mainly quartzite, highly fractured, some calcite mottling on top, light tan to tan, difficult to determine the orientation.

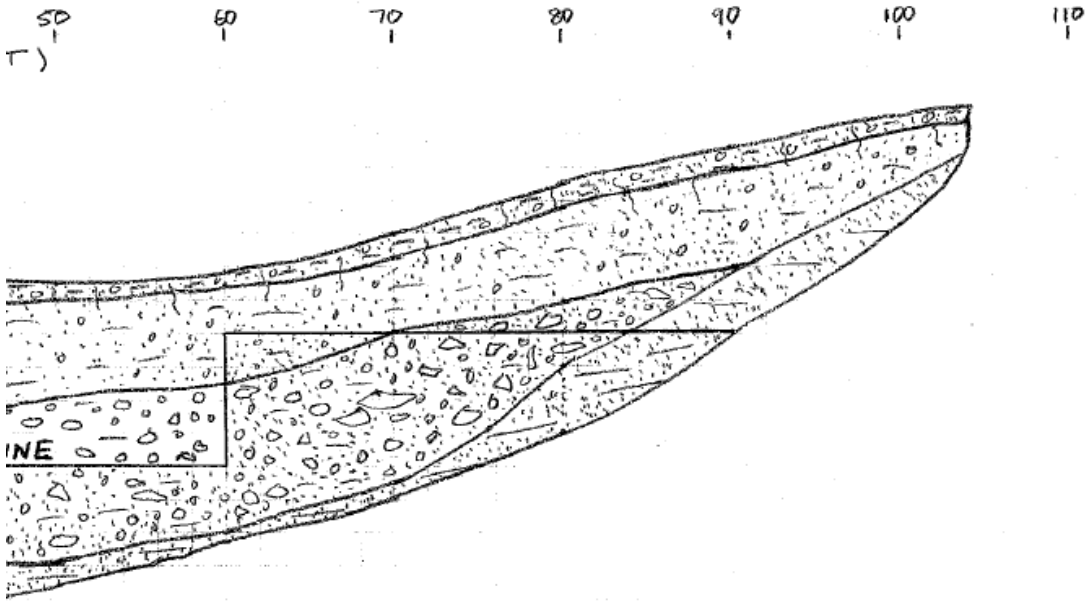
EXPLORATION TRENCH ET-3 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N329°E

PROJECT NO.: 219075	Earthtec Engineering	FIGURE NO.: 8a

EXPLORATION TRENCH ET-3 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND SETTLEMENT CANYON ROAD
TOOELE, UTAH



Scale: 1 inch = 10 feet | Northeast Wall of Trench | Trend: N329°E

PROJECT NO.: 219075	Earthtec Engineering	FIGURE NO.: 8b

EXPLORATION TRENCH ET-3 LOG
ONE O'CLOCK HILL - FRHS
UT-36 AND STTLEMENT CANYON ROAD
TOOELE, UTAH

Unit Descriptions

1) **Soil horizon A** – silty sand with gravel, dark brown, roots and organics, pinholes, low moisture

2) **Alluvium** – silty sand with gravel (SM), potentially reworked by Lake Bonneville activities, massive, 15%-20%, medium to very coarse, subangular to subrounded gravel, massive, poorly sorted, brown, roots diminishing with depth, very low moisture.

3) **Colluvium** – poorly graded with gravel with sand, silt, cobble and sparce boulder (GP-GM), massive, medium to very coarse, angular to subangular gravel with calcite mottling, 70% clast, 30% soil, massive, in sand matrix, moderately sorted, mostly limestone clasts, brown, roots diminishing with depth.

4) **Lacustrine Bonneville Sand (Qla)** – silty clayey sand (SC-SM), massive, some iron oxide stain, very well sorted, brown, moist.

APPENDIX A

Frank F. Namdar, P.G., E.I.T.

Utah DOPL – Professional Geologist	191486-2250
National Assessment Institute – Fundamentals of Engineering	1997

Work Experience-

Project Manager

Earthtec Engineering - Ogden, UT
August 2015 - Present
Geologist, Engineer-

*Prepared Geotechnical Investigation Reports
*Performed Geotechnical Investigations
*Performed Phase I & II Environmental Site Assessments
*Performed Geological Studies & Hazard Evaluations & reporting

Project Manager

Bingham Engineering, Inc. – Salt Lake City, UT
March 2003 - August 2015
Engineer, Geologist-

*Performed Phase I, II Environmental Site Assessments
*Performed Environmental Site Characterizations
*Performed Environmental Remedial Investigation
*Performed Remedial Actions
*Performed Geologic Hazard Studies
*Performed Geotechnical Studies
*Performed Environmental Sampling of indoor/outdoor Air, Soil, Surface and Ground Water
*Prepared Health & Safety Plans
*Performed Landfill Gas Testing
*Prepared NPDES Permit Compliance, reports, SWPPP, SPPP
*Performed Hazardous Materials Survey
*Performed Radiological Sampling, monitoring, Waste Characterizations, Human Health Risk Assessments, RI/FS, Remediations

Project Engineer

Summit Engineering Services – Salt Lake City, UT
March 2001 - February 2003
Engineer, Scientist

*Prepared environmental site assessment, subsurface investigation, quarterly monitoring reports, corrective action plan and feasibility studies on various remediation techniques related to underground storage tanks
*Operated and maintained groundwater and soil remediation systems related to USTs *Observed circular and H pile installation and performed
* Performed geotechnical analysis, design and recommendation, geological hazard evaluations and field explorations.

Project Engineer — Pentacore Resources – Salt Lake City, UT
August 2000 - March 2001
Engineer, Scientist

* Performed environmental engineering analysis, reports, research, field exploration and sampling, inspection, and AUTOCAD drawing for Phase I, Phase II, and RBCA projects
* Managed various environmental and Geotechnical projects
* Performed NPDES permit compliance, reports, site status monitoring reports and hazardous materials survey.
*Prepared Prepared NPDES Permit Compliance, reports, SWPPP, SPPP

Staff Engineer — Terracon – Salt Lake City, UT
May 1998 - August 2000
Engineer, Geologist

* Performed Geotechnical analysis, design and recommendations, geological hazard evaluations, field explorations, and laboratory testing for: commercial buildings along the Wasatch Front; Utilities and communication Towers in Utah, Idaho, and Wyoming; City, County and State Roads; Municipal Structures

Field Engineer — Maxim Technologies – Salt Lake City, UT
August 1993 - May 1998
Engineer, Geologist

*Performed Geotechnical analysis, soil design, field explorations, laboratory testing, and field construction inspections
*Prepared proposals and cost estimates and solicited potential clients for Geotechnical and construction inspections projects
* Performed environmental site assessments, groundwater modeling, field exploration, sampling, and UST removal and installations for various projects

Geologist — Airtech International, Inc. – Newport Beach, CA
October 1992 - December 1992
Environmental Geologist

* Prepared work plan for landfill soil gas sampling, and constructed test holes and monitoring wells for landfill soil gas and ground water sampling

Staff Engineer — Rogers & Associates Engineering Corporation – Salt Lake City, UT
January 1990 - December 1992
Environmental Engineer

*Performed ground water modeling, human health risk assessments
*Performed remediation investigations and feasibility studies

* Performed landfill performance assessments, and remediation and decommissioning for DOE, EPA and NRC projects
*Performed radiological monitoring and sampling to characterize NORM at a natural gas storage and distribution facility
*Performed site suitability and cost analysis, and possible subsurface geophysical options available for site evaluations for low level radioactive waste

Geologist

Sergent, Huskins, and Beckwidth– Salt Lake City, UT
March 1988 - December 1990
Geologist, Engineering Assistant
* Performed geological background documentation, map and aerial photograph research, geologic hazard evaluation, photogeologic study for Kern River Pipeline project. Performed geological mapping, field data and sample collection. Conducted various field and laboratory soils tests, inspected materials for construction projects and prepared daily and weekly reports.

Education-

University of Utah- Salt Lake City, UT
*Bachelor Degree – Geology 1990
University of Utah- Salt Lake City, UT
*Bachelor Degree – Geological Engineering 1992

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1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

November 16, 2021

Tooele 90 LLC
Attention: Mr. Shaun Johnson
6975 Union Park Ave., Ste 600
Cottonwood Heights, UT 84047

Re: Rockfall Hazard Evaluation
One O'clock Hill
Settlement Canyon Road and UT-36
Tooele, Utah
Job No: 219076

Gentlemen:

This letter summarizes the results of Earthtec Engineering's completed Rockfall Hazard Evaluation for the One O'clock Hill project in Tooele, Utah. The subject property is approximately 38 acres and is proposed to be developed with new single-family houses. See Figure No. 1, *Vicinity Map* for the location of the site.

Introduction

The subject site is undeveloped land that consist of three parcels. It is proposed for future development of new single-family houses. The subject site is included in the Utah Geological Survey (UGS) OFR-318[1], Plate 4H map, as a potential rockfall impact site (Appendix A). The steep slopes of Oquirrh Mountains to the south of the site are the subject of this study and these mountains trend from the southwest to the northeast. The geologic units at the site is mapped by Donald L. Clark, Charles G. Oviatt, and David A. Dinter[2] are presented in Figure 2, Geologic Map of the Site, and are described as the following:

Qafy **Younger fan alluvium, post-Lake Bonneville (Holocene to uppermost Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; deposited by streams, debris flows, and flash floods on alluvial fans and in mountain valleys; merges with unit Qal; includes alluvium and colluvium in canyon and mountain valleys; may include areas of eolian deposits and lacustrine fine-grained deposits below the Bonneville shoreline; includes active and inactive fans younger than Lake Bonneville, but may also include some older deposits above the Bonneville shoreline.

Qmct **Colluvium and talus (Holocene to upper Pleistocene)** – Local accumulations of mixed colluvium and talus throughout the map area; common near Lake Bonneville shorelines; thickness up to 15 feet (5 m).

[1] Utah Geological Survey (UGS) open file report 318 Plate 4H: Rock-fall hazard and depth to ground water, Tooele quadrangle, Tooele County, Utah, 1995; Mapped by Kimm M. Harty and Bill D. Black
[2] Utah Geological Survey (UGS) open file report 284DM map: "Interim Geologic Map of the Tooele 30' x 60' Quadrangle, Tooele, Salt Lake, and Davis Counties, Utah, 2020, by Donald L. Clark, Charles G. Oviatt, and David A. Dinter.

Qla **Lacustrine and alluvial deposits, undivided (Holocene to upper Pleistocene)** – Sand, gravel, silt, and clay; consist of alluvial deposits reworked by lakes, lacustrine deposits reworked by streams and slopewash, and alluvial and lacustrine deposits that cannot be readily differentiated at map scale.

Qafo **Older fan alluvium, pre-Lake Bonneville (upper to middle? Pleistocene)** – Poorly sorted gravel, sand, silt, and clay; similar to unit Qafy, but forms higher level incised deposits that predate Lake Bonneville; includes fan surfaces of different levels; fans are incised by younger alluvial deposits and locally etched by Lake Bonneville.

Tiqlp **Quartz latite porphyry dikes and sills (late to middle Eocene)** – Medium-brown and light-greenishgray, hornblende-biotite quartz latite porphyry; hornblende is altered to phlogopite and/or chlorite within the Bingham pit area; distinguished from other latitic dikes and sills by the presence of relatively large quartz phenocrysts and higher percentage of aphanitic groundmass; groundmass usually contains considerable hornblende (KUCC, 2009); includes Raddatz porphyry dikes with large K-feldspar phenocrysts (Settlement Canyon area) (see Krahulec, 2005; new geochemical data in Clark and Biek, 2017), and the Andy Dike and apophyses at Bingham mine (KUCC, 2009); 40Ar/39Ar ages of 37.66 ± 0.08 and 37.72 ± 0.09 Ma (Deino and Keith, 1997), and U-Pb zircon age of 37.97 ± 0.11 Ma (von Quadt and others, 2011); also forms some small dikes (unmapped) east of Pass Canyon and near North Oquirrh thrust (Swensen and others, 1991) with K-Ar age of 36.5 ± 1.1 Ma (Moore, 1973); Raddatz dike has 40Ar/39Ar age of 39.4 ± 0.34 Ma (Kennecott in Krahulec, 2005).

IPobmu **Oquirrh Group, Bingham Mine Formation, upper member (Upper Pennsylvanian, Virgilian-Missourian)** – Light gray to tan, thinly color-banded and locally cross-bedded quartzite with interbedded thin, light- to medium-gray calcareous, fine-grained sandstone, limestone, and siltstone.

Rock Fall Analysis Methodology

This rockfall study is focused on the west and middle parcel of the project (study area). The northeast parcel lacks evidence of past rockfalls and the source to present the potential for rockfalls at this time.

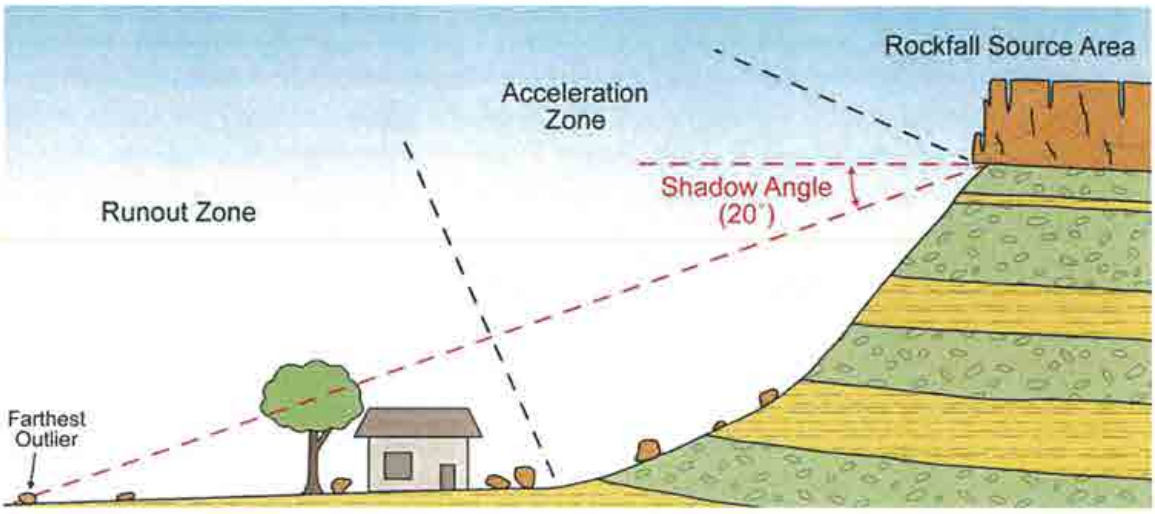
Iron County Code 17.59.030 (3) is being used for the rockfall analysis. Tooele County Code does not provide specific details for conducting a Rock Fall Study, this code was developed in conjunction with the State of Utah Geological Survey (UGS).

As described in Section 1.1 of Iron County Code 17.59.030 (3) for rockfall analysis:

Rock-fall geologic study areas are not mapped in Iron County at this time, but include locations at the base of rock and talus slopes that are susceptible to rock fall—evidence of past rock falls being the primary indictor. A twenty-two-degree shadow angle, extending from the base of the rock-fall source area, as depicted in the following diagram, shall be used to define the extent of a rock-fall geologic study area. (Note: Shadow angle is dependent on the type of rock involved, and the rock-fall hazard area determined by the geologist may be more or less than that captured by the twenty-two-degree shadow angle used to define the study area. However, twenty-two degrees is relatively conservative, and is deemed sufficient to capture most rock-fall hazard situations.)

A rock-fall geologic study area consists of three components: (1) a rock source, in general defined by bedrock geologic units that exhibit relatively consistent patterns of rock-fall susceptibility throughout the study area, (2) an acceleration zone, where rock fall debris detached from the source gain momentum as it travels downslope—this zone often includes a talus slope, which becomes less apparent with decreasing relative hazard and is typically absent where the hazard is low, and finally (3) a runout zone (rock-fall shadow zone), which includes gentler slopes where boulders have rolled or bounced beyond the base of the acceleration zone. (Lund, et al., 2008 in County Code 17.59.030 (3)).

Typical components of a rockfall path profile are presented below (modified from Lund, et al., 2008):



Prior to the start of field investigations, a search of available literature and maps were performed and the published geologic literature and maps relevant to the subject site were reviewed, with particular emphasis on information pertaining to the presence of known rockfall sources and the past history of the rockfalls at or near the subject site. The sources are referred to in this report.

Outcrop Evaluation

A professional geologist from Earthtec Engineering visited the site on October 18, 2021. Several areas of the site were observed to collect information regarding the presence of rockfall hazard

at the site, evidence of past rockfalls, surficial condition and topography of the site. The elevation at the peaks beyond the southeast boundary of the study area ranges from approximately 6,005 feet above sea level (ASL) at the peak of Two O'clock Hill and 5,844 feet ASL at the peak of One O'clock Hill, to approximately 5,200 feet ASL at the base of the mountains.

Several outcrops are visible on the steep slopes southeast of the study area. These outcrops have been mapped on the geologic map and have general northeast-southwest strike and dip 25 to 32 degrees to the northwest (Clark Oviatt, Dinter, 2017). The average slopes on the south portion of the study area and above are approximately 45-50% and consist of mostly fractured quartzite outcrops on the higher elevations (5500 feet to approximately 5,800 feet ASL). Large talus fields are observed across much of the northwest-facing slopes, including the entirety of One O'clock Hill and at elevations of 5,525 to 5,530 feet ASL on Two O'clock Hill. These quartzite taluses are generally angular with weathered surfaces and are less than 18-inches in diameter.

At the approximate high stand of Lake Bonneville elevation (5,200 feet ASL) colluvium, and at shallower portions alluvial sediments are observed. Below the elevation of approximately 5,200 feet ASL numerous boulders of up to 3 feet in diameter were observed. The boulders were comprised mainly of quartzite and were moderately weathered. The geologic unit named IPobmu appears to be the susceptible geologic unit and the source of the rockfall at the site and is evident in the outcrops. Some lichens were observed on most of the boulders. Boulders are concentrated at approximately 200 feet south of UT-36 on the surface of the alluvial field and along the slope of the mountains. Substantial soil deposits were present around the large boulders at the time of our investigation. The surface of the study area is generally covered moderately with grass, sage brush of up to 2 feet in height, and occasional short maple trees with maximum height of 10 feet. Outcrops on the slopes above the site contain boulders approximately 3 feet in diameter with some with soil deposits around them.

A shadow angle is the angle between a horizontal line and a line extending from the base of the rock source to the outer limit of the runout zone as defined by the farthest outlier rockfall debris at a site as shown in the figure above. A site-specific calculation of the shadow angles for One O'clock Hill and Two O'clock Hill were performed. For both, the shadow angle was calculated for outcroppings observed at approximately 5,620 feet ASL. The shadow angle for One O'clock Hill is 20 degrees. The shadow angle for Two O'clock Hill is 18 degrees. These angles are due to a consistently steep acceleration zone and an abruptly flat runout zone that reduces the extent of potential impacts to the development along UT-36.

For One O'clock Hill, the farthest outlier boulder was assumed to reach approximately 330 feet west of the Bonneville Shoreline, at approximately 5,185 feet ASL that appear to be at roughly the same elevation as the location of power line poles at the site. For Two O'clock Hill, the outer limits of the runout zone was assumed to be approximately 390 feet west of the Bonneville Shoreline, at approximately 5,167' ASL. These assumptions are made by observing the approximate location of the larger boulders that are found southeast of UT-36, their distribution, weathering, amount of soil deposited around the boulders and embedding, surface roughness and vegetation at the site. This also assumes undisturbed site conditions and is due to lack of available information regarding the age and frequency of existing boulders and lack of evidence of the farthest outlier clasts due to the development of the UT-36 and to the north of this highway. The location of this group of boulders, as they are lined up to south of the road, could also be the

result of presence of Lake Bonneville as these clasts collide with the lake surface and dramatically reduce speed.

Rock Fall Analysis

This section documents the results of a rockfall analysis for the building areas presented in Figure No. 3, *Shadow Angle Determination.* Several outcrops are visible on both parcels. There are several talus fields below these outcrops. The property falls within the shadow angles of the outcrops.

Topographic (Figure No. 4, *Topographic and Shadow Angle Determination Location*) and visual analyses indicate that the likely trajectory for rock fall emanating from these outcrops would fall to the northwest of the hillslopes which will include the building areas along the southeast side of UT-36. The likelihood of rock fall emanating from these outcrops and impacts to the building areas is moderate as evidenced by the presence of boulders in those areas. While the likelihood of repeated rockfall that reach the development areas is low as evidenced by their age from weathering of some of the large boulders found southwest of the highway on the property, the risk of occasional boulder dislodge from the higher slopes above the site still exists.

Due to deep groundwater elevation, the groundwater does not impact the outcrops and does not contribute to the rockfall hazard at the subject site. The angular and planar nature of the rock fragments reduces the possibility of dislodged rocks from gaining momentum in acceleration zone. The potential for rockslide during an earthquake is also low to moderate due to shape of rock fragments and slope angle above the site, as most of the talus slopes appear to be stabilized by reaching a stable slope near the bottom of the mountains above the site, allowing at-rest position for these rock fragments at even 50% or higher grades. Vegetation established around the these talus slopes show that they are relatively old and currently stable. Slopewash is technically outside of the purview of a Rock Fall Analysis and is not described in the code; the slopes above the proposed building areas were evaluated in the geotechnical study in conjunction with this hazard evaluation. The amount of slopewash at the base of the slope in the relatively flat area of the site near the road is relatively low. This indicates that the slope has stabilized over time. Vegetation coverage on this slope is approximately 60% and includes sagebrush, grasses, and several patches of small maple trees. Presence of soil and vegetation produces surface roughness that reduces the potential of triggering a mass rockslide or dislodging other unstable boulders in the path.

According to Circular 1283 Utah Geological Survey 2020 Guidelines, Chapter 7: Guidelines for investigating geologic hazards and preparing engineering-geology reports:

Rockfall probability: A rockfall investigation, performed as described above, will establish the presence or absence of a rockfall hazard at a site and define a boundary beyond which the risk from future rockfalls is much reduced. However, determining (predicting) the exact timing of future rockfalls is not possible, and is not likely to become possible in the foreseeable future. As a general rule, the more rockfall debris on or at the base of a slope, the more frequent rockfalls are, and the higher the hazard. However, with sufficient data it is possible to estimate the probability

[3] Lund, W.R., P.G., Knudsen, T. R., P.G., Guidelines for investigating geologic hazards and preparing engineering-geology reports, second edition; CHAPTER 7. GUIDELINES FOR EVALUATING ROCKFALL HAZARDS IN UTAH, Utah Geological Survey Circular 128, 2020

(x % chance in y years) of future rockfalls at a site. Conducting a probabilistic analysis requires information on both the number and timing of past rockfalls (Turner, 2012). Only a few areas in Utah have both a high rockfall hazard and a history of rockfall damage to structures to have produced a significant record of historical rockfalls. Rockville, Utah, is one such place, where six large rockfalls have occurred over the past 13 years (figure 48) (Knudsen, 2011; Lund and others, 2014), resulting in an average recurrence interval (average repeat time) for large rockfalls of 2.2 years. The annual probability of a large rockfall in Rockville based on the 13-year record is 46%. Three of the rockfalls struck and damaged inhabited structures, and one of the three caused two fatalities (figure 49). Such well-documented rockfall histories are rare, so in most instances, timing of past rockfalls must be determined by other means. In Yosemite National Park, Stock and others (2012a, 2012b) used cosmogenic beryllium-10 exposure ages to date the surfaces of rockfall boulders exposed to cosmogenic radiation for the first time following the rockfall. They integrated the number of identified rockfall events, rockfall timing data, and computer simulations of rockfall runout to develop a hazard boundary with a 10% probability of exceedance in 50 years for rockfall-susceptible areas of Yosemite Valley. Such detailed probabilistic rockfall-hazard investigations are costly both in terms of time and money and are beyond the scope of most rockfall investigations. However, a probabilistic rockfall investigation may be required when evaluating hazard and risk for high-value infrastructure or for areas of prolonged high human occupancy in rockfall-susceptible areas.

Rock Fall Mitigation

As noted in Circular 128 Utah Geological Survey 2020 Guidelines the Early recognition and avoidance of areas subject to rockfall are the most effective means of mitigating rockfall hazard.

Determining the boundary of the rockfall runout zone and siting all new buildings for human occupancy and IBC Risk Category II, III, and IV facilities (ICC, 2017a) outside that zone will substantially reduce rockfall risk. However, because the boundary of a rockfall runout zone seldom can be established with a high level of precision, the UGS recommends that structures for human occupancy or high-risk facilities be set back an appropriate distance from the runout-zone boundary to provide an additional factor of safety from rockfalls. Rockfall hazard is highly dependent on site geologic and topographic conditions; therefore, the UGS does not make a standard setback recommendation, but rather recommends that the engineering geologist in responsible charge of the rockfall investigation make and justify an appropriate setback based on the results of the site-specific hazard investigation. Where investigation results provide confidence in the runout-zone boundary, additional setback can be minimized. Where the boundary is uncertain, a larger setback is appropriate.

Many techniques are available to mitigate rockfall hazard. Rockfall mitigation is often conducted by specialized design-build manufacturers and/or contractors, often using proprietary techniques and/or materials. Circular 128 indicates that mitigation techniques include, but are not limited to:

- Rock stabilization by manually stabilizing rocks on the slopes above the site.
- Engineered structures to block the rocks that will typically dislodge during the spring-time in Utah due to freeze and thaw in the winter and rain in the spring.
- Modification of at-risk structures. In this case, built-in components in parking garage structures may be used as means of blockage.

Rock-stabilization methods are physical means of reducing the hazard at its source using rock bolts and anchors, steel mesh, scaling, or shotcrete on susceptible outcrops. Engineered catchment or deflection structures such as rockfall fences, berms, swales, or benches can be placed below source areas, or at-risk structures themselves can be designed to stop, deflect, retard, or retain falling rocks. Such methods, however, may increase rockfall hazard if not properly designed and maintained. Detailed information on rockfall mitigation techniques is given in "Part 3: Rockfall Mitigation" of *Rockfall Characterization and Control* (Turner and Schuster, 2012).

General Conditions

The information presented in this letter applies only to the study area defined earlier, on the subject site. It should be noted that site grading activities and changes in conditions at the site such as vibration and other man-made or natural events may produce higher hazard risks. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in this area at this time. No warranty or representation is intended in our proposals, contracts, reports, or letters.

Closure

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
EARTHTEC ENGINEERING

Michael S. Schedel
Staff Geologist

LICENSED PROFESSIONAL GEOLOGIST
FARHANG F. NAMDAR
191486-2250
11/16/2021
STATE OF UTAH

Frank N. Namdar, P.G., E.I.T.
Project Geologist

FN/ms

Attached:

Figure No. 1 *Vicinity Map*
Figure No. 2 *Geologic Map*
Figure No. 3 *Shadow Angle Determination*
Figure No. 4 *Topographic Map-Shadow Angle Determination Locations*

Appendix A Utah Geological Survey (UGS) OFR-318, Plate 4H map

VICINITY MAP

ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH

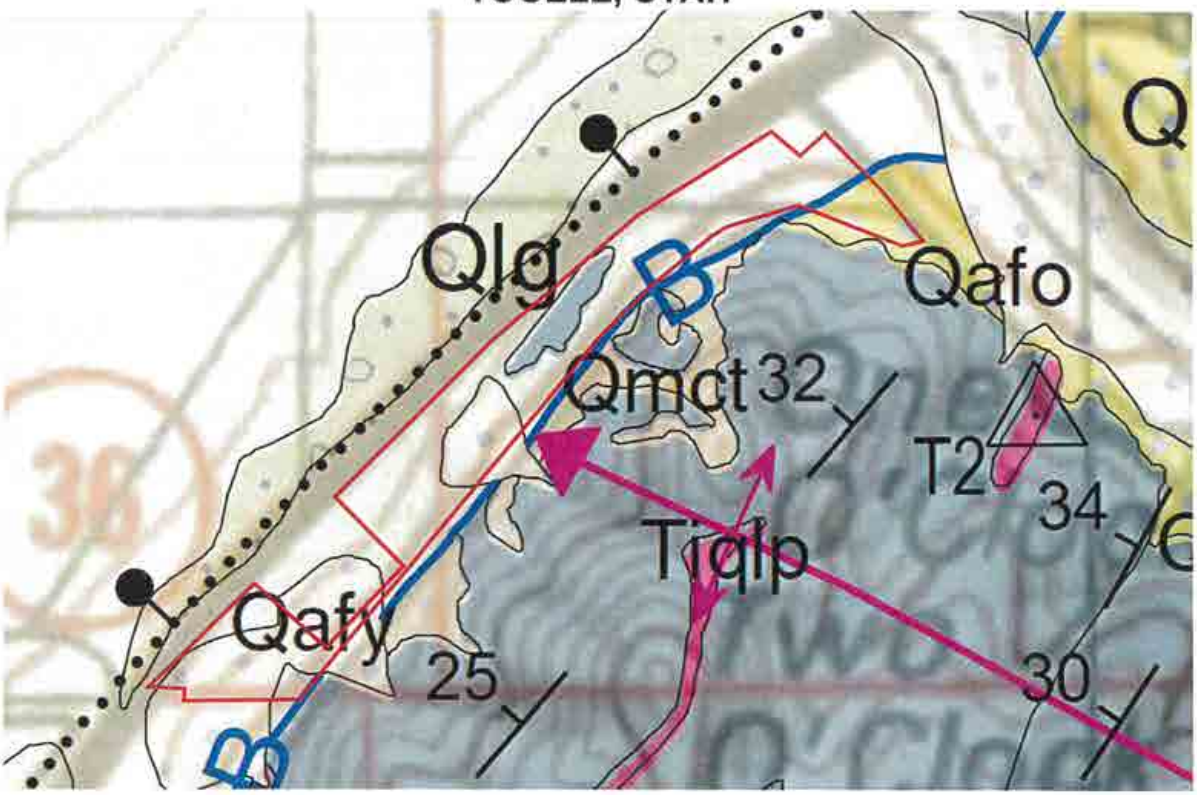
Site Perimeter

N

Not to Scale

PROJECT NO.: 219076		FIGURE NO.: 1

GEOLOGIC MAP
ONE O'CLOCK HILL
SETTLEMENT CANYON ROAN AND UT-36
TOOELE, UTAH



Utah Geological Survey (UGS) open file report 669 map: "Interim Geologic Map of the Tooele 30' x 60' Quadrangle, Tooele, Salt Lake, and Davis Counties, Utah, 2017, by Donald L. Clark, Charles G. Oviatt, and David A. Dinter.

IPobmu — **Oquirrh Group, Bingham Mine Formation, upper member (Upper Pennsylvanian, Virgilian-Missourian)** – Light-gray to tan, thinly color-banded and locally cross-bedded quartzite with interbedded thin, light- to medium-gray, calcareous, fine-grained sandstone, limestone, and siltstone; several of the thin calcareous units are locally important as marker beds; upper-lower member contact is placed at base of the Manefay limestone marker bed; unit is very similar to the lower member above the Commercial Limestone (Swensen, 1975); Virgilian and Missourian fusulinids (Triticites) are reported from the Markham Peak section (R.C. Douglass in Tooker and Roberts, 1970), and Welsh and James (1961) reported a Virgilian and Missourian age for the entire formation; 2200 feet (670 m) thick at the Bingham district (Swensen, 1975).

Tiqlp — **Quartz latite porphyry dikes and sills (late to middle Eocene) –** Medium-brown and light-greenish-gray, hornblendebiotite quartz latite porphyry; hornblende is altered to phlogopite and/or chlorite within the Bingham pit area; distinguished from other latitic dikes and sills by the presence of relatively large quartz phenocrysts and higher percentage of aphanitic groundmass; groundmass usually contains considerable hornblende (KUCC, 2009); includes Raddatz porphyry dikes with large K-feldspar phenocrysts (Settlement Canyon area) (see Krahulec, 2005; new geochemical data in Clark and Biek, 2017), and the Andy Dike and apophyses at Bingham mine (KUCC, 2009); 40Ar/39Ar ages of 37.66 ± 0.08 and 37.72 ± 0.09 Ma (Deino and Keith, 1997), and U-Pb zircon age of 37.97 ± 0.11 Ma (von Quadt and others, 2011); also forms some small dikes (unmapped) east of Pass Canyon and near North Oquirrh thrust (Swensen and Kennecott staff, 1991) with K-Ar age of 36.5 ± 1.1 Ma (Moore, 1973); Raddatz dike has 40Ar/39Ar age of 39.4 ± 0.34 Ma (Kennecott, unpublished age in Krahulec, 2005).

Not to Scale

PROJECT NO.: 219076		FIGURE NO.: 2a

GEOLOGIC MAP
ONE O'CLOCK HILL
SETTLEMENT CANYON ROAN AND UT-36
TOOELE, UTAH

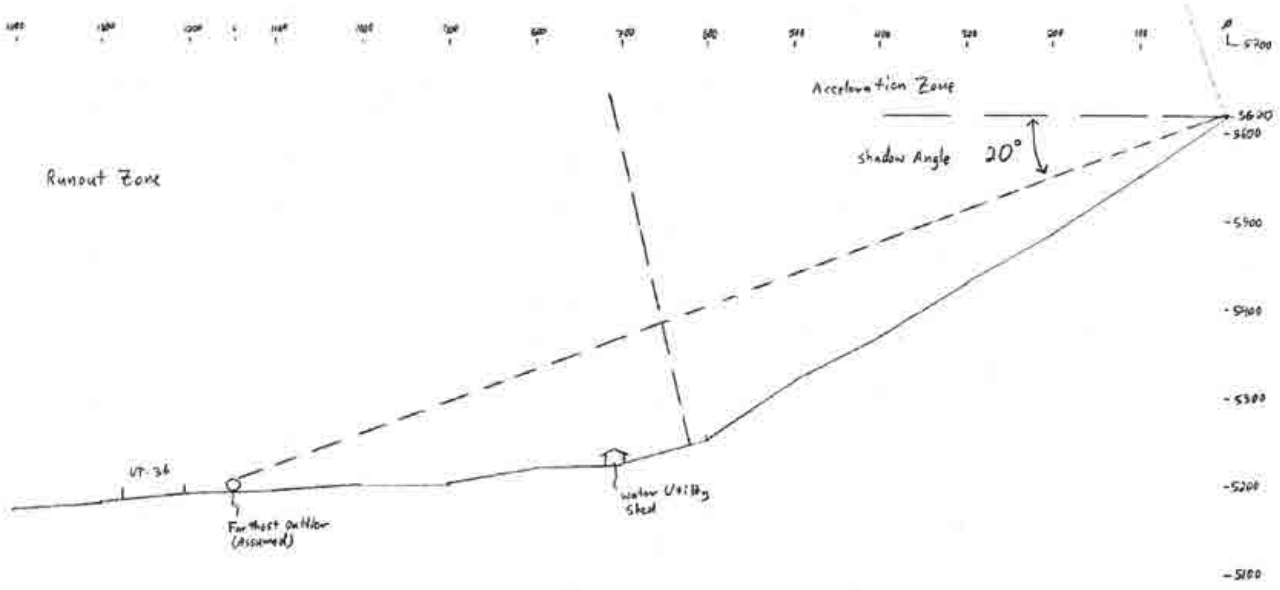
Qafy	**Younger fan alluvium, post-Lake Bonneville (Holocene)** -- Poorly sorted gravel with sand, silt, and clay; deposited by streams, debris flows, and flash floods on alluvial fans and in mountain valleys; merges with unit Qal; includes alluvium and colluvium in canyon and mountain valleys; may include small areas of eolian deposits and lacustrine fine-grained deposits below the Bonneville shoreline; includes active and inactive fans younger than Lake Bonneville, but may also include some older deposits above the Bonneville shoreline; locally, unit Qafy spreads out on lake terraces and, due to limitations of map scale, is shown to abut Lake Bonneville shorelines; Qafy also drapes over, but does not completely conceal shorelines; thickness variable, to 50 feet (15 m) or more.
Qafo	**Older fan alluvium, syn- and pre-Lake Bonneville (upper to middle? Pleistocene)** -- Poorly sorted gravel with sand, silt, and clay; forms higher level deposits that are coeval with and predate Lake Bonneville; includes fan surfaces of different levels; fans are incised by younger alluvial deposits and locally etched by Lake Bonneville; may locally include small areas of lacustrine or eolian deposits, and younger alluvium; thickness variable, to 100 feet (30 m) or more.
Qlg	**Lacustrine gravel (Holocene to upper Pleistocene)** -- Sandy gravel to boulders composed of locally derived rock fragments deposited in shore zones of Great Salt Lake and Lake Bonneville; clasts are typically well rounded and sorted; locally tufa-cemented (especially the Provo shoreline, figure 2) and draped on bedrock; thickness variable, to 100 feet (30 m) or more.
Qla	**Lacustrine and alluvial deposits, undivided (Holocene to upper Pleistocene)** -- Unconsolidated deposits of sand, gravel, silt, and clay; consist of lacustrine deposits reworked by streams and slopewash, alluvial deposits reworked by lakes, and alluvial and lacustrine deposits that cannot be readily differentiated at map scale, thickness locally exceeds 30 feet (10 m).
Qmct	**Colluvium and Talus (Holocene to Upper Pleistocene)** – Local accumulations of mixed colluvium and talus throughout the maps area; common near Lake Bonneville shorelines; thickness up to 15 ft (5 m).

Not to Scale

PROJECT NO.: 219076	EARTHTEC ENGINEERING	**FIGURE NO.:** 2b

SHADOW ANGLE DETERMINATION
ONE O'CLOCK HILL

ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH



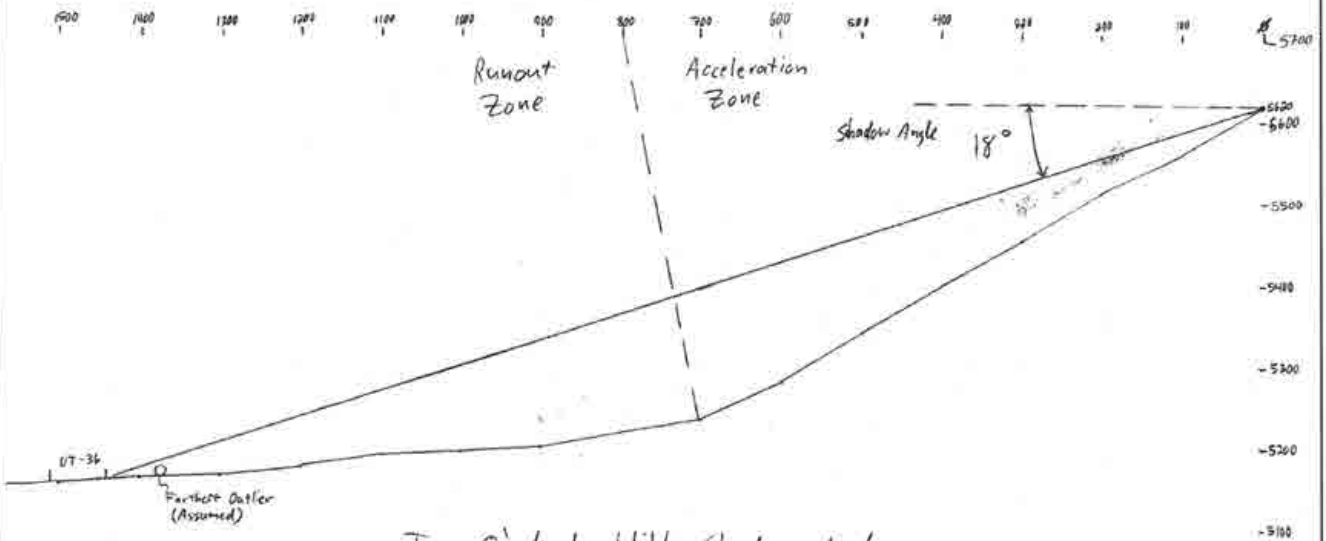
One O'clock Hill Shadow Angle

N

Not to Scale

PROJECT NO.: 219076	EARTHTEC ENGINEERING	FIGURE NO.: 3a

SHADOW ANGLE DETERMINATION
TWO O'CLOCK HILL
ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH



Two O'clock Hill Shadow Angle

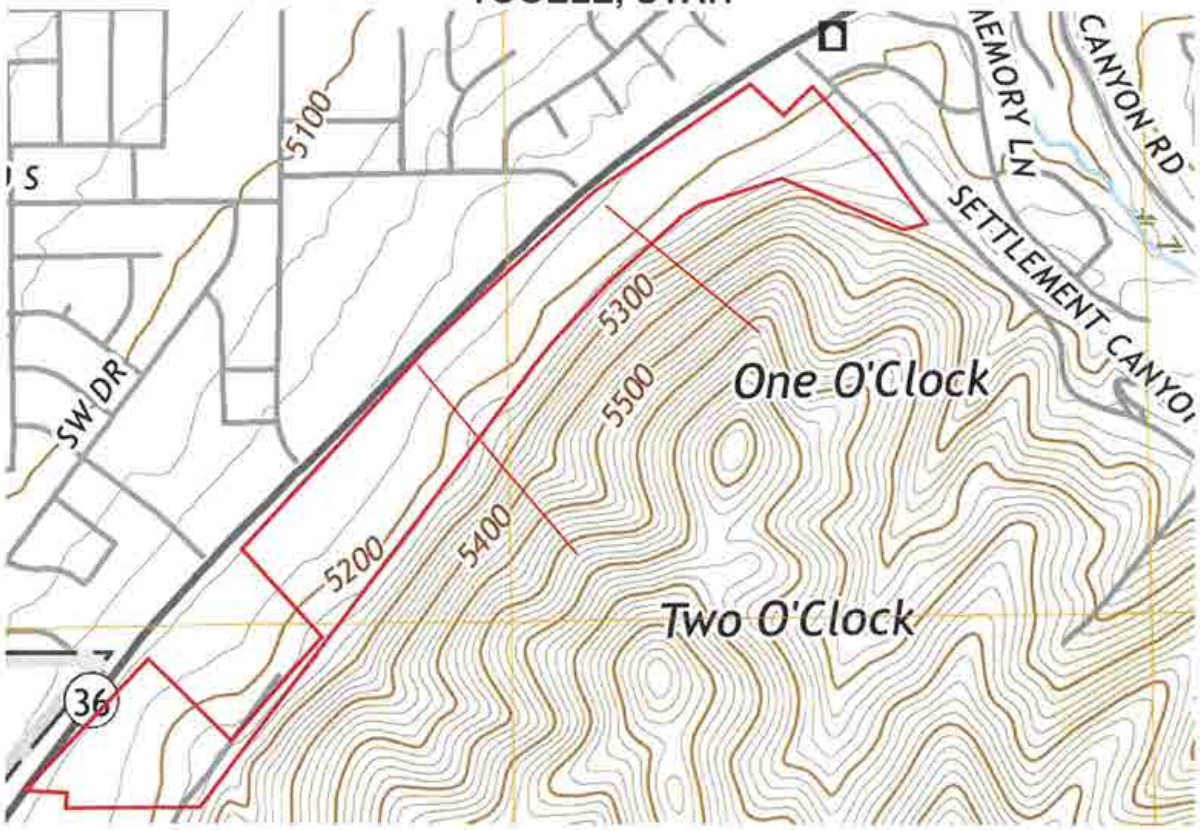
N

Not to Scale

PROJECT NO.: 219076		FIGURE NO.: 3b

TOPOGRAPHIC MAP-SHADOW ANGLE DETERMINATION LOCATIONS

ONE O'CLOCK HILL
SETTLEMENT CANYON ROAD AND UT-36
TOOELE, UTAH



Utah AGRC Topographic Map

Shadow Angle Determination location

N

Not to Scale

PROJECT NO.: 219076		FIGURE NO.: 4

APPENDIX A

CIVIL ENGINEERING

11038 N Highland Blvd
Suite 400
Highland Ut, 84003
office (801) 492-1277
cell (801) 616-1677
ken@bergcivil.com

Nov 29th, 2021

To: Tooele City Council

Re: One O'Clock Hill Development

Project Location: UT-36 and Settlement Canyon

Applicant: Tooele 90 LLC

Request: Approval of a Zoning Map Amendment to remove the Sensitive Area Overlay to portions of the proposed development.

Sensitive Areas Overlay

(1) The purpose of the Sensitive Area Overlay is to provide regulatory standards, guidelines, and criteria having the effect of minimizing flooding, erosion, destruction of natural plant and wildlife habitat, alteration of natural drainages, and other environmental hazards, and protecting the natural scenic character of the hillside and mountain areas. In support of this purpose and intent, this overlay recognizes the importance of the unique hillside and mountain areas of Tooele City to the scenic character, heritage, history, and identity of Tooele City and of adjoining areas of unincorporated Tooele County. In support of this purpose and intent, Tooele City finds that it is in the public interest to regulate the development of sensitive areas in a manner so as to minimize the adverse impacts of development on scenic open spaces and on sensitive or vulnerable organic and inorganic systems. (7-12-2.1)

(2) The standards, guidelines, and criteria established by the overlay are intended to support the purpose and intent of the overlay by working to accomplish the following:

a. To protect the public from the natural hazards of storm water runoff, erosion, and landslides. (7-12-2.2)

i. **APPLICANT RESPONSE**

1. **Storm Water Runoff –** All future development of the subject property is required to comply with city standards to construct facilities to convey and detain the runoff generated from a 25-year storm event with an outflow at a maximum of 0.2 cfs/ac. Additional requirements are to *1) construct facilities to divert surface water away from cut faces or sloping surfaces of fill. 2) protect natural drainage ways. 3) construction of detention basins to minimize peak flows.*

2. **Erosion –** All future development of the subject property is required to comply with city standards to construct facilities to minimized erosion as follows: *1) Construction of the development site to minimize disturbance during the wet times of the year – between Oct 15 and Mar 15. 2) Installation of erosion control measures and best management practices during construction to minimize erosion at the source.*

3. **Landslides, Rockfall Hazard, & Faults**– a Geotechnical Study of the subject property has prepared by Earthtec Engineering (see Appendix for full report). As part of the study, a slope stability analysis was performed for both the static and seismic conditions.

   The results indicated that the slope configuration at the proposed lot analyzed is stable under both modeled conditions.

   All future development of the subject property is required to comply with the recommendations of the geotechnical report with states: *1) if unretained cuts greater than 6 feet on the slope area are planned or retainage walls are required, we recommend that further analysis of the slope be performed.*

   A Rockfall Hazard Evaluation was performed by Earthtec Engineering to determine the hazard level. The report states *"The likelihood of rock fall emanating from these outcrops and impacts to the building area is **moderate** as evidenced by the presence of boulders in those areas. While the likelihood of repeated rockfall that reach the development areas is **low** as evidenced in their age from weathering of some of the large boulders found just south of the road on the property, the risk of an occasional boulder dislodge from the higher slopes above the site still exists."*

   The Surface Fault Rupture Hazard Study was performed by Earthtec to reviewed potential for active faulting and related earthquakes are present for the subject property. The report states *"Based on our observations and analyses, the area to be suitable for the planned construction from a surface fault rupture hazards perspective, provided the recommendations presented in this report are carefully followed and implemented. We recommend observing all footing excavations prior to installing the concrete footing forms, to verify that no surface rupture faults are located below the planned foundation."*

   Refer to Figure 3 that shows the Fault Trenches and setback line for buildable areas.

Recommendations

The geotechnical studies that have been performed for the proposed areas for development support the proposed zone change request to remove the Sensitive Area Overlay to the portion of the property to be developed.

Conclusion

I have reviewed these studies and the recommendations provided. The additional requirements can be included in the proposed development and site layout to mitigate the hazards detailed in the geotechnical studies. Additional plans, details and studies will be provided to the city for review as part of the Subdivision process.

Respectfully,

Ken R. Berg, PE

APPENDIX

Geotechnical Study – Earthtec Engineering Project No. 219074

Surface Fault Rupture Hazard Study - Earthtec Engineering Project No. 219075

Rockfall Hazard Evaluation - Earthtec Engineering Project No. 219076

TOOELE CITY CORPORATION

ORDINANCE 2022-10

AN ORDINANCE OF TOOELE CITY AMENDING TOOELE CITY CODE CHAPTER 7-24 REGARDING ANNEXATION.

WHEREAS, Utah Constitution, Article XI, Section 5 directly confers upon Utah's charter cities, including Tooele City, "the authority to exercise all powers relating to municipal affairs, and to adopt and enforce within its limits, local police, sanitary and similar regulations not in conflict with the general law"; and,

WHEREAS, Utah Code Section 10-8-84 enables Tooele City to "pass all ordinances and rules, and make all regulations . . . as are necessary and proper to provide for the safety and preserve the health, and promote the prosperity, improve the morals, peace and good order, comfort, and convenience of the city and its inhabitants, and for the protection of property in the city"; and,

WHEREAS, municipal annexations are governed by Utah Code Chapter 10-2 Part 4, and by Tooele City Code Chapter 7-24; and,

WHEREAS, Chapter 7-24 was enacted in 1975 and was revised in 1984, with other amendments in 1995, 1996, and 1998, and the City Administration recommends that Chapter 7-24 be updated and harmonized with current Utah Code provisions and Tooele City practice; and,

WHEREAS, some of the key proposed amendments of this Ordinance include the following: (a) specifying the technical information required prior to Planning Commission consideration and City Council approval; (b) harmonizing City Code procedures with Utah Code requirements for annexation petitions, local entity plats, and Lt. Governor certification; (c) explaining the timing of the annexation agreement approval vis a vis annexation petition approval; and, (d) clarifying that the required two-thirds (2/3) "super-majority" vote is in fact a four-fifths (4/5) vote; and,

WHEREAS, annexation policy questions are critical to a municipality's character, services, and future; and,

WHEREAS, the Planning Commission convened a public hearing on March 23, 2022, accepted public comment, and provided its recommendation to the City Council; and,

WHEREAS, the City Council convened a public hearing on April 6, 2022, and accepted public comment:

NOW, THEREFORE, BE IT ORDAINED BY TOOELE CITY that Tooele City Code Chapter 7-24 is hereby amended, as shown in Exhibit A.

This Ordinance shall become effective upon passage, without further publication, by authority of the Tooele City Charter.

IN WITNESS WHEREOF, this Ordinance is passed by the Tooele City Council this ____ day of _____, 2022.

TOOELE CITY COUNCIL

(For) (Against)

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

ABSTAINING: _____

MAYOR OF TOOELE CITY

(Approved) (Disapproved)

_____ _____

ATTEST:

_____
Michelle Y. Pitt, City Recorder

S E A L

Approved as to Form: _____
Roger Evans Baker, City Attorney

Exhibit A

Proposed Amended Tooele City Code Chapter 7-24

(redline and clean)

CHAPTER 24. ANNEXATION

7-24-1. Procedure for annexation.
7-24-2. Initial zoning classifications.
7-24-3. Annexation Agreement.

7-24-1. Procedure for annexation.

(1) Whenever a majority of the real property owners and not less than one third (1/3) of the real property owners as determined by the value of all of the parcels of real property taken together in the contiguous area proposed for annexation, according to the last assessment rolls, desire to have Tooele City annex the property to Tooele City, they shall proceed as follows:

(a) Prepare a written petition signed by the above-referenced property owners, which petition shall be directed to the Community Development Department, together with a completed City annexation application form and payment of the application fee. The petition shall include the legal description of the land area proposed for annexation, and shall otherwise comply with the requirements of U.C.A. Chapter 10-2 Part 4.

(b) Submit an accurate plat of the land area proposed for annexation. The plat shall include areas for the signatures of the Planning Commission members, including the date of recommendation, the City Council members, including the date of approval, the City Attorney approving the plat as to form, the City Recorder for plat certification, and the County Recorder for recordation. The plat shall conform to the requirements of U.C.A. Section 17-23-20, as amended, regarding final local entity plats.

(c) After the signed petition and the plat have been submitted, the petition and plat shall be presented to the City Attorney for review as to form, and to the City Recorder for certification.

(d) Following City Attorney review and City Recorder certification, the petition and plat shall be presented to the City Council, which shall approve or reject a resolution to accept the petition for further consideration.

(e) Following acceptance by resolution of the petition for further consideration, and prior to Planning Commission review and recommendation, the petitioners shall provide at their expense the following detailed studies, among others, for consideration by the City as to the impacts of the proposed annexation upon the City:

(i) culinary water system, including source, storage, transmission, distribution, treatment, and water rights;

(ii) sanitary water system, including collection and treatment;

(iii) storm water retention, detention, and drainage;

(iv) parks and recreation;

(v) police response;

(vi) fire response;

(vii) fiscal and tax;

(viii) others as determined by the City Council.

(f) Following approval of a resolution to the accept the petition for further consideration, the petition and plat, together with the above-required studies, shall be presented to the Planning Commission for recommendation.

(e) After review and recommendation of a petition by the Planning Commission, the plat and petition, together with the above-required studies, shall be presented to the City Council to study at one or more work meetings and for final action at a business meeting, after public hearing.

(f) The petition and annexation may be approved by ordinance upon the vote of four-fifths (4/5) of the members of the City Council, which approving members shall execute their approval by signature upon the plat in the place provided.

(g) Subsequent to approval by the City Council, the City Recorder shall submit the plat and Ordinance to the Utah Lt. Governor as required by U.C.A. 10-2-25, as amended.

(Ord. 1984-01, 01-04-1984) (Ord. 1975-12, 05-12-1975)

7-24-2. Initial zoning classifications.

All land areas annexed to Tooele City shall receive the zoning classification the City Council identifies in the ordinance of annexation. No portion of the annexed land shall be re-classified to another zoning designation without following the procedure provided by the Utah Code and the Tooele City Code for zoning reclassification.

(Ord. 1984-01, 01-04-1984) (Ord. 1975-12, 05-12-1975)

7-24-3. Annexation Agreement

(1) Annexation approval is conditioned upon all annexation petitioners executing an Annexation Agreement with the City. The Agreement shall provide, among other things, for the transfer of water rights to the City in compliance with Chapter 26 of this Title. Approval of the annexation by ordinance shall occur only following approval of the Agreement by resolution. Execution of the Agreement by the petitioners shall occur prior to City Council execution of the annexation plat. Refusal by one or more of the petitioners to execute the Agreement shall be grounds for rescinding the Council's annexation approval and for not submitting the plat and ordinance to the Lt. Governor.

(2) The City Recorder shall cause the Agreement to be recorded with the Tooele County Recorder.

(Ord. 1998-31, 08-18-1998) (Ord. 1996-22, 11-6-1996) (Ord. 1995-20, 12-15-1995)

CHAPTER 24. ANNEXATION~~ANNEXED AREAS~~

7-24-1. Procedure for annexation.
7-24-2. Initial zoning classifications.
7-24-3. Annexation Agreement~~Transfer of Water Shares~~.

7-24-1. Procedure for annexation.

(1) Whenever a majority of the real property owners and not less than one third (1/3) of the real property owners as determined by the value of all of the parcels of real property ~~tracts~~ taken together in the contiguous area proposed for annexation~~to be annexed~~, according to the last assessment rolls, desire to have Tooele City annex the property ~~the particular area~~ to Tooele City, they shall proceed as follows:

(a) Prepare a written petition signed by the above-referenced property owners, ~~said majority, and by one third (1/3) of the real property owners by value, as determined by the last assessment rolls, of the real property to be annexed,~~ which petition shall be directed to the Community Development Department, together with a completed City annexation application form and payment of the application fee. ~~Tooele City Planning and Zoning Board and the Tooele City Council, and shall petition said Board and Council for the annexation of~~ The petition shall include the legal description of the land area proposed for annexation, ~~a particular contiguous area to Tooele City, andshall set forth the legal description of the entire tractto be annexed~~and shall otherwise comply with the requirements of U.C.A. Chapter 10-2 Part 4.

(b) ~~In addition, said property owners shall~~ Submit ~~cause~~ an accurate plat of the land area proposed for annexation.~~such territory to be prepared under the supervision of the Tooele City Engineer or by a surveyor licensed by the State of Utah setting forth the metes and bounds description of the territory to be annexed and designating both limits to which it is contiguous. Said~~ The plat shall ~~also~~include areas for the signatures of ~~, in the margin, a proper certification with date, signature and seal by the Engineer or surveyor preparing the same, an Approval for Execution by~~ the Planning Commission members, ~~and Zoning Board of Tooele City~~ including the date of recommendation, ~~execution and lines for the signatures of each member approving the same, an Approval for Execution by the members of~~ the City Council members, ~~approvingtheplat,~~including the date of approval, ~~and a signature line for each member executing the same, a marginal box for execution by~~ the City Attorney approving the plat as to form, ~~a marginal box for~~ the ~~Tooele~~City Recorder for ~~'s~~ plat certification, and the County Recorder for recordation. The plat shall conform to the requirements of U.C.A. Section 17-23-20, as amended, regarding final local entity plats. ~~that the same was filed with the City Recorder's Office and indicating the day and time of said filing as well as a separate certification by the City Recorder that said plat and Ordinance Number was approved by the City Council including the date of approval and certification by the City Council. In addition, a marginal box shall be provided for the County Recorder's documentation as to the book, page, date and time of recordation as well as the signature and seal of the County Recorder. There shall be no other marginal notations upon the plat.~~

(c) After the signed petition and the plat have been submitted, ~~has been prepared as set forth in Section 1(b) hereof and the petition has been executed by each real property owner signing the same, their signatures having been acknowledged by a Notary Public, said~~ the petition and plat shall be presented to the City Attorney for ~~his or her approval~~review as to form, and to the City Recorder for certification.

(d) Following City Attorney review and City Recorder certification, the petition and plat shall be presented to the City Council, which shall approve or reject a resolution to accept the petition for further consideration.

(e) Following acceptance by resolution of the petition for further consideration, and prior to Planning Commission review and recommendation, the petitioners shall provide at their expense the following detailed studies, among others, for consideration by the City as to the impacts of the proposed annexation upon the City:

(i) culinary water system, including source, storage, transmission, distribution, treatment, and water rights;

(ii) sanitary water system, including collection and treatment;

(iii) storm water retention, detention, and drainage;

(iv) parks and recreation;

(v) police response;

(vi) fire response;

(vii) fiscal and tax;

(viii) others as determined by the City Council.

(f) Following approval of a resolution to the accept the petition for further consideration, ~~Subsequent to the approval of the City Attorney as to the form of the plat, said~~ the petition and plat, together with the above-required studies, shall be presented to the ~~Tooele City~~ Planning Commission for recommendation~~and Zoning Board at either a general or special meeting, attended by a quorum or majority of said Board for approval of said body~~.

(e) After review and recommendation ~~Uponapproval~~of a petition by the Planning Commission, ~~and Zoning Board and the execution of Approval upon the plat by signatures of a majority of the members of said Board voting therefor,~~ the plat and petition, together with the above-required studies, shall be ~~filed with the City Recorder who shall present the~~

same presented to the Tooele City Council to study at one or more work meetings and for final action at a business meeting, after public hearing.the next regular meeting thereof, for the approval by the City Council.

(f) The petition and annexation may be approved by ordinance upon the vote of four-fifths (4/5) Iftwo thirds (2/3) of all ofthe members of the City Council, which approving members shall vote at a regular meeting of said Council for the annexation as petitioned, they shall so declare said annexation by Ordinance passed by said two thirds (2/3) of all members of the Council. Those members declaring the annexation by Ordinance shall execute their approval by signature upon the plat in the place provided.

(g) Subsequent to theapproval by the City Council, the City Recorder shall cause saidplat and the Ordinance to be certified as to their authenticity indicating the day of approval by a two thirds (2/3) majority of the council and shall cause the same to be recorded in the office of the Tooele County Recorder.submit the plat and Ordinance to the Utah Lt. Governor as required by U.C.A. 10-2-25, as amended. (Ord. 84-01, 01-04-84; Ord. 75-12, 05-12-75)

7-24-2. Initial zoning classifications.

All newland areas annexed to Tooele City as provided above shall receive the zoning classification be classified as the the City Council shallordainidentifies in the Ordinance of annexation. No portion of the annexed land saidterritoryshall be granted a variance or be re-classified to another zoning designation without following the procedure provided by the Utah Code and the Tooele City Code for suchvariancesorzoning reclassifications being adhered to. (Ord. 84-01, 01-04-84; Ord. 75-12, 05-12-75)

7-24-3. Annexation Agreements

(1) Annexation approval is conditioned upon all annexation petitioners executing an Annexation Agreement with the City. The Agreement shall provide, among other things, for the transfer of water rights to the City in compliance with Chapter 26 of this Title. Approval of the annexation by ordinance shall occur only following approval of the Agreement by resolution. Execution of the Agreement by the petitioners shall occur prior to aCity Council execution of the annexation platvote on the proposed annexation. Refusal by one or more of the petitioners to execute the Agreement shall be grounds for rescinding the Council's annexation approval refusingto and for not submitting the plat and ordinance to the Lt. Governorannex the land subject to the petition.

(2) The City Recorder shall cause the Agreement to be recorded with the Tooele County Recorder. as an encumbrance upon the title to the annexed property. A copy of the executed Agreement shall be attached to the Annexation Individual Policy Declaration approved by the City Council, and shall be recorded with the Policy Declaration. (Ord. 98-31, 08-18-98); (Ord. 96-22, 11-6-96); (Ord. 95-20, 12-15-95)

STAFF REPORT
March 17, 2022

To: Tooele City Planning Commission
Business Date: March 23, 2022

From: Planning Division
Community Development Department

Prepared By: Jim Bolser, Director

Re: **Nonresidential Zoning District Setbacks – City Code Text Amendment Request**
Application No.: P22-273
Applicant: Tooele City
Request: Request for approval of a City Code Text Amendment regarding certain setback requirements in the various nonresidential zoning districts.

BACKGROUND

This application is a request for approval of a City Code Text Amendment to address certain setback requirements within the various nonresidential zoning districts. In August 2021 the City Council approved an amendment to the City Code dealing primarily with setback requirements for the I Industrial zoning district. The intent of that amendment was to reduce the setbacks from 30 feet to a minimum potential setback of 15 feet for side setbacks. At the same time, the side and rear setbacks in the other nonresidential zones, particularly the LI Light Industrial, IS Industrial Service, and RD Research and Development zoning districts, were increased to minimum possibility of 15 feet for side setbacks to create a more uniform provision across the zones. The setback requirement previously was 0 feet. In the time since this provision was changed, there have been applications made that this new setback provision placed a hefty burden upon, even limiting the developability of certain sites. For this reason, this proposed City Code Text Amendment proposes to take a closer look at the setback requirements of the nonresidential zoning districts.

ANALYSIS

City Code. When examining the applicability of certain provisions of the City Code, it is fundamental to first look at the reasons the provision exists in the first place. The principle of a setback is relatively straightforward but can take on some unique aspects based on the uses involved. One such instance was at the heart of the amendment the City Council approved in August 2021. When dealing with uses typically considered heavier, they typically involve activities or materials that present some of the highest potential for a negative impact on adjacent properties. In such cases it makes sense to create a separation between those potential hazards or impacts and the neighboring properties. There is also the question of lesser impacts onto neighboring properties. This could come in the form of storm water runoff from structures imposing onto adjacent properties or the ability to maintain buildings on a site without having to encroach onto the neighboring property, among others. Through examining these aspects in light of the subject amendment, the zoning districts at issue, although still industrial in nature, are not districts that carry those heaviest uses or present the highest risk of the hazards or potential impacts for adjacent properties. As such, it is considered prudent to examine a more appropriate setback requirement that balances the needs of the separation requirements with that of the developability and reasonability of the provisions. For that reason, the staff has been examining the uses and provisions of these lesser intense nonresidential zoning districts to see if a better

balance can be struck. As a result, this request proposes to amend certain setback provisions within some of the nonresidential zoning districts to better strike this balance. In addition, this request also proposes to amend certain notations tied to those requirements to provide better clarity and to address the ability and circumstances whereby there can be no setback requirement when development proposals are to construct across property lines jointly. The proposed language for the subject City Code Text Amendment request can be found in Exhibit "A" to this report.

Criteria For Approval. The criteria for review and potential approval of a City Code Text Amendment request is found in Section 7-1A-7 of the Tooele City Code. This section depicts the standard of review for such requests as:

(1) No amendment to the Zoning Ordinance or Zoning Districts Map may be recommended by the Planning Commission or approved by the City Council unless such amendment or conditions thereto are consistent with the General Plan. In considering a Zoning Ordinance or Zoning Districts Map amendment, the applicant shall identify, and the City Staff, Planning Commission, and City Council may consider, the following factors, among others:
   (a) The effect of the proposed amendment on the character of the surrounding area.
   (b) Consistency with the goals and policies of the General Plan and the General Plan Land Use Map.
   (c) Consistency and compatibility with the General Plan Land Use Map for adjoining and nearby properties.
   (d) The suitability of the properties for the uses proposed viz. a. viz. the suitability of the properties for the uses identified by the General Plan.
   (e) Whether a change in the uses allowed for the affected properties will unduly affect the uses or proposed uses for adjoining and nearby properties.
   (f) The overall community benefit of the proposed amendment.

REVIEWS

Planning Division Review. The Tooele City Planning Division has completed their review of the City Code Text Amendment request and has issued the following comments:

1. The proposed text amendment will provide for a better balance between regulation and developability.
2. The proposed text amendment will provide for better clarity in the City Code.

Engineering Review. The Tooele City Engineering Division has completed their review of the City Code Text Amendment request and has issued the following comment:

1. The proposed text amendment maintains an allowance for site development while addressing site needs such as storm water runoff and building maintenance.

Building Division Review. The Tooele City Building Division has completed their review of the City Code Text Amendment request and has issued the following comment:

1. The proposed text amendment allows for building construction within the requirements and allowances of the Building Code.

Noticing. The applicant has expressed their desire to revise the terms of the City Code and do so in a manner

which is compliant with the City Code. As such, notice has been properly issued in the manner outlined in the City and State Codes.

STAFF RECOMMENDATION

Staff recommends the Planning Commission carefully weigh this request for a City Code Text Amendment according to the appropriate tenets of the Utah State Code and the Tooele City Code, particularly Section 7-1A-7(1) and render a decision in the best interest of the community with any conditions deemed appropriate and based on specific findings to address the necessary criteria for making such decisions.

Potential topics for findings that the Commission should consider in rendering a decision:

1. The effect the text amendment may have on potential applications regarding the character of the surrounding areas.
2. The degree to which the proposed text amendment may effect a potential application's consistency with the intent, goals, and objectives of any applicable master plan.
3. The degree to which the proposed text amendment may effect a potential application's consistency with the intent, goals, and objectives of the Tooele City General Plan.
4. The degree to which the proposed text amendment is consistent with the requirements and provisions of the Tooele City Code.
5. The suitability of the proposed text amendment on properties which may utilize its provisions for potential development applications.
6. The degree to which the proposed text amendment may effect an application's impact on the health, safety, and general welfare of the general public or the residents of adjacent properties.
7. The degree to which the proposed text amendment may effect an application's impact on the general aesthetic and physical development of the area.
8. The degree to which the proposed text amendment may effect the uses or potential uses for adjoining and nearby properties.
9. The overall community benefit of the proposed amendment.
10. Other findings the Commission deems appropriate to base their decision upon for the proposed application.

MODEL MOTIONS

Sample Motion for a Positive Recommendation – "I move we forward a positive recommendation to the City Council for the Nonresidential Zoning District Setbacks City Code Text Amendment Request by Tooele City, application number P22-273, based on the following findings:"

1. List findings …

Sample Motion for a Negative Recommendation – "I move we forward a negative recommendation to the City Council for the Nonresidential Zoning District Setbacks City Code Text Amendment Request by Tooele City, application number P22-273, based on the following findings:"

1. List findings …

EXHIBIT A

PROPOSED REVISIONS TO TABLE 2 OF CHAPTER 7-16
OF THE TOOELE CITY CODE TEXT

TABLE 2
DEVELOPMENT STANDARDS

DEVELOPMENT REQUIREMENT	DISTRICT									
	Mixed Use **(MU-G) (MU-B)**	Neighborhood Commercial **(NC)**	General Commercial **(GC)**	Regional Commercial **(RC)**	Light Industrial **(LI)**	Industrial Service **(IS)**	Industrial **(I)**	Research & Development **(RD)**	Downtown Overlay **(DO)**	Gateway Overlay **(GO)**
Minimum Side Yard Setback	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	30 Feet	As Allowed by Building Code but not less than ~~1~~5 feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than ~~1~~5 feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than 15 feet.	As Allowed by Building Code but not less than ~~1~~5 feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	~~Note A~~ *Per Underlying Zoning District*	~~Note B when adjoining a Residential Zone Otherwise See Note A~~ *Per Underlying Zoning District*
Minimum Rear Yard Setback	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	30 Feet	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than 20 feet.	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	~~See Note A~~ *Per Underlying Zoning District*	~~Note B when adjoining a Residential Zone. Otherwise See Note A~~ *Per Underlying Zoning District*

Minimum Rear Yard Setback (Corner Lot)	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	Note B when adjoining a Residential Zone. Otherwise See Note A*1*	30 Feet	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	As Allowed by Building Code but not less than 20 feet.	As Allowed by Building Code but not less than ~~20~~ *10* feet *with Note A2*. Note B when adjoining a Residential Zone ~~Otherwise See Note A~~	~~See Note A~~ *Per Underlying Zoning District*	~~Note B when adjoining a Residential Zone. Otherwise See Note A~~ *Per Underlying Zoning District*

NOTES:

A.

1. As allowed by the International Building Code and any required or existing easements. Side yard setbacks measured from a street right-of-way for corner lots in the MU-B zoning district may be reduced to 0 feet upon approval of the Planning Commission as a part of design review in compliance with Title7 Chapter 11 of the Tooele City Code. *Structures shall not be allowed to be constructed within an existing or proposed easement or right-of-way.*

2. Developments on adjoining lots or parcels that are designed, approved, and constructed as one application or project may have the setback reduced to 0 feet to facilitate a cohesive conjoined development across both properties. Structures shall not be allowed to be constructed within an existing or proposed easement or right-of-way.

B. The minimum setback requirements of the *adjoining* Residential Zoning District shall apply for all ~~adjoining lots,~~ buildings, parking areas, mechanical equipment, solid waste containers, and all other structures. Side yard setbacks measured from a street right-of-way for corner lots in the MU-B zoning district may be reduced to 0 feet upon approval of the Planning Commission as a part of design review in compliance with Title 7 Chapter 11 of the Tooele City Code. *Structures shall not be allowed to be constructed within an existing or proposed easement or right-of-way.*

TOOELE CITY CORPORATION

ORDINANCE 2022-11

AN ORDINANCE OF TOOELE CITY ENACTING A TEMPORARY ZONING ORDINANCE REGARDING GARAGE PARKING IN MULTI-FAMILY RESIDENTIAL DEVELOPMENTS.

WHEREAS, Utah Constitution, Article XI, Section 5 directly confers upon Utah's charter cities, including Tooele City, "the authority to exercise all powers relating to municipal affairs, and to adopt and enforce within its limits, local police, sanitary and similar regulations not in conflict with the general law"; and,

WHEREAS, Utah Code Section 10-8-84 enables Tooele City to "pass all ordinances and rules, and make all regulations . . . as are necessary and proper to provide for the safety and preserve the health, and promote the prosperity, improve the morals, peace and good order, comfort, and convenience of the city and its inhabitants, and for the protection of property in the city"; and,

WHEREAS, Utah Code Section 10-9a-505 enables Tooele City to "enact an ordinance establishing a temporary zoning regulation," without prior Planning Commission recommendation or public hearings, upon the City Council finding a "compelling, countervailing public interest" in doing so, with "temporary" meaning not to exceed six months; and,

WHEREAS, the Utah Supreme Court case of *Western Land Equities v. Logan City* (1980) identified and established a common law principle called the Pending Ordinance Rule, which provides that a land use or development "application for a permitted use cannot be refused **unless a prohibiting ordinance is pending at the time of application**"; further, "if a city…has initiated proceedings to amend its zoning ordinances, a landowner who subsequently makes application for a permit is not entitled to rely on the original zoning designation" (emphasis added); and,

WHEREAS, like UCA Section 10-9a-504, the Pending Ordinance Rule requires a legislative finding of a compelling, countervailing public interest; and,

WHERREAS, *Western Land Equities* also established Utah's vested development rights rule that, except for the Pending Ordinance Rule, a land use application establishes the date on which development rights vest, as well as the set of land use ordinances applicable to the approved land use; and,

WHEREAS, *Western Land Equities* recognizes the unfairness and the threat to the public interest where the announcement of a future zoning ordinance change would trigger a race to file and vest land use applications prior to the municipality's ability to follow the established lengthy process for amending land use ordinances, thus subverting and undermining the very public policies supporting the need for the zoning ordinance amendment; and,

WHEREAS, Tooele City Code Section 7-4-4, referring to Table 7-4-1, requires two off-street parking spaces for all dwellings, including detached single-family dwellings, attached single-family dwellings (e.g., townhouses, duplexes), condominiums, and apartments; and,

WHEREAS, on August 13, 2021, the Tooele City Zoning Administrator issued an administrative interpretation stating that, in a townhouse development, garages may not count toward off-street parking requirements, noting the occupant penchant to use garage space for storage rather than for vehicles, and that if townhouse driveways were not provided, occupant and visitor parking would be pushed on-street, undermining the legislative policy behind requiring off-street parking; and,

WHEREAS, the Zoning Administrator's administrative interpretation was not appealed pursuant to the administrative appeals procedure identified in the City Code (i.e., first to the Director of Community Development under TCC Section 1-27-4, then to the Administrative Hearing Officer under TCC Section 1-27-5 and Chapter 1-28); and,

WHEREAS, though no formal administrative appeals of the Zoning Administrator's administrative interpretation have been submitted pursuant to City Code procedures, other developers have complained about the administrative interpretation, which interpretation is the basis of the City's practice to not count garage space toward off-street parking requirements for townhouse developments; and,

WHEREAS, the City Administration and the City Council believe that the Zoning Administrator's administrative interpretation is correct, and further believes that the City Code should be amended to provide more predictable and understandable legislative language in support of that interpretation; and,

WHEREAS, were the City to allow townhouse developments to count garage space as off-street parking space, without adequate driveway lengths to provide off-street parking, and were occupants to use garages for storage, which is typical, off-street parking would of necessity be pushed on-street, with no other area for off-street parking; and,

WHEREAS, because townhouses are typically narrow structures on small narrow lots, the number of drive/garage access from the street are proportionately much higher than in single-family subdivisions, and the increased number of drive/garage accesses dramatically decreases the amount of on-street parking available to the public; and,

WHEREAS, streets within townhouse developments are often private streets, for internal traffic circulation, and thus can be narrower than public streets, as narrow as 26 feet under the International Fire Code, and with cars parked on both sides of the street due to insufficient off-street parking, the street becomes impassable to many emergency response vehicles (i.e., ambulances, fire trucks), impassable for two-way vehicle traffic,

and difficult even for one-way vehicle traffic, further exacerbating the public safety risks of predominant on-street parking; and,

WHEREAS, Tooele City has prior experience with precisely this scenario, including with The Fields of Overlake townhomes and West Pointe Meadows townhomes, in which garages are used for storage, no other (or insufficient) off-street parking spaces were provided, and both occupant and visitor parking are pushed onto the street; and,

WHEREAS, TCC Section 10-3-6 provides that "(1) It shall be unlawful to park a vehicle on any public right-of-way: (a) when snow is falling upon that vehicle; or, (b) when snow or ice have accumulated in any amount on the right-of-way upon which that vehicle is parked." This legislatively-enacted regulation is necessary to allow adequate snow plowing, to reduce the risk of snow plows striking and damaging parked vehicles, to avoid injury to snow plow drivers and damage to snow plows, to remove snow from public streets sufficiently to allow safe vehicle travel, to allow safe emergency vehicle access including police vehicles, ambulances, and large fire apparatus, to preserve the full public street travel way for its intended purpose of traffic circulation, to allow safe garbage removal by large garbage trucks, to minimize stacking of deep snow against vehicles parked on the street in a way that the vehicles cannot move, among other things; and,

WHEREAS, TCC 10-3-6 recognizes the public safety risk of on-street parking in winter by providing, "Any vehicle parked in violation of this Section may be removed at the discretion of the Tooele City Police Department for creating public safety risks and for obstructing the City's snow removal efforts"; and,

WHEREAS, while on-street parking is not prohibited during non-winter seasons, pushing *all* or nearly all occupant and visitor parking onto the street creates a real safety risk for children and other pedestrians crossing the street from between parked vehicles, reducing and confusing driver visibility of the roadway and of crossing children and other pedestrians, increasing risks for children and others riding bicycles in the roadway as required by State of Utah transportation regulations, among other dangers; and,

WHEREAS, developers have suggested that imposing a recorded covenant prohibiting storage of personal property in townhouse garages, and enforcing the covenant through a homeowner's association, would mitigate the City's on-street parking concerns. The City Administration and City Council believe, however, that the covenant would be ignored due in part to the lack of storage space inside small townhouse units, and would be practically and politically impossible to enforce, for the following reasons, among others:

- the covenant contradicts the normal, typical, popular, accepted, and expected resident behavior of using garages for personal property storage;
- enforcement of the covenant would be very unpopular with residents, creating contention and community division among the association board members and their neighbors;
- the covenant would be no more enforceable than a recorded covenant against sneezing, or waving to neighbors, or children playing in the yard; and,

WHEREAS, all of the above considerations and findings serve to support a finding of a compelling, countervailing public interest to require off-street parking other than garage space in townhouse developments and to disallow garage space to count toward off-street parking requirements; and,

WHEREAS, the City Administration avers that, when enacting its off-street parking regulations, the City Council intended for townhouse developments to provide off-street parking in addition to garage space, as with all single-family dwellings, though the Code does not specify minimum driveway lengths for townhouse developments; and,

WHEREAS, the City Administration recommends that the City Code be amended to disallow developers and their design professionals from counting garage space toward off-street parking requirements; and,

WHEREAS, following approval of this Ordinance and the temporary zoning regulation proposed herein, the City Council will have a maximum of six months to discuss and determine its legislative policy regarding counting garage space toward off-street parking requirements in townhouse, condominium, and other attached single-family dwelling developments; and,

NOW, THEREFORE, BE IT ORDAINED BY THE TOOELE CITY COUNCIL as follows:

1. This Ordinance 2022-11 is hereby approved; and,

2. The temporary zoning ordinance enumerated and described in this Ordinance 2022-11 is hereby temporarily enacted; and,

3. This Ordinance 2022-11 and the temporary zoning regulation are effectively immediately, as authorized by the Tooele City Charter; and,

4. For the duration of this temporary zoning regulation, all townhouse, condominium, and other attached single-family and multi-family developments shall provide the minimum required off-street parking spaces without considering garage space; and,

5. This Ordinance 2022-11 shall be in effect until a land use regulation is enacted following the regular Planning Commission, City Council, and public hearing and notice processes required by the Utah Code and the Tooele City Code, but in no event for longer than six months; and,

6. The City Administration, including planning staff, are hereby instructed to prepare draft City Code language on the subject of this Ordinance 2022-11 for consideration by the City Council; and,

7. Should a new land use regulation governing garage parking not be enacted within the six-month period referenced above, the existing City Code provisions will govern; and,

8. This Ordinance 2022-11 and its temporary zoning regulation shall have binding application upon all land use applications submitted after the date on which proceedings began to amend the City Code regarding garage parking, that date being March 18, 2022; and,

9. As required by Utah Code Section 10-9a-504 and *Western Land Equities*, the City Council hereby makes a finding of compelling, countervailing public interest in disallowing garage parking to count toward required off-street parking spaces due to the reasonably foreseeable risks to the public health and safety of occupant and visitor parking being located on the public streets, those risks being more fully described at length in the recitals above, which recitals are hereby incorporated into this finding; and,

10. Similarly, the City Council hereby finds that failing to approve this Ordinance 2022-11 and enact this temporary zoning ordinance, a residential parking crisis would result, as early as the next approved townhouse development in the vicinity of that development, with the crisis compounding with the proliferation of townhouses developments with inadequate off-street parking.

11. Nothing in this Ordinance 2022-11 shall be considered to eliminate or reduce the current visitor parking requirements of the City Code, and nothing shall allow dwelling unit driveways and garage space to be counted as visitor parking space.

This Ordinance is necessary for the immediate preservation of the peace, health, safety, and welfare of Tooele City and its residents and businesses and shall become effective upon passage, without further publication, by authority of the Tooele City Charter.

IN WITNESS WHEREOF, this Ordinance is approved by the Tooele City Council this ____ day of _____, 2022.

TOOELE CITY COUNCIL

(For) (Against)

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

ABSTAINING: _____

MAYOR OF TOOELE CITY

(Approved) (Disapproved)

_____ _____

(If the mayor approves this ordinance, the City Council passes this ordinance with the Mayor's approval. If the Mayor disapproves this ordinance, the City Council passes the ordinance over the Mayor's disapproval by a super-majority vote (at least 4). If the Mayor neither approves nor disapproves of this ordinance by signature, this ordinance becomes effective without the Mayor's approval or disapproval. UCA 10-3-704(11).)

ATTEST:

_____
Michelle Y. Pitt, City Recorder

S E A L

Approved as to Form: _____
Roger Evans Baker, City Attorney

Tooele City Planning Commission
Business Meeting Minutes

Date: Wednesday, March 9, 2022
Time: 7:00 p.m.
Place: Tooele City Hall Council Chambers
90 North Main Street, Tooele Utah

Commission Members Present:
Melanie Hammer
Nathan Thomas
Chris Sloan
Tyson Hamilton
Weston Jensen
Paul Smith
Melodi Gochis
Alison Dunn

Commission Members Excused:
Matt Robinson

City Council Members Present:
Maresa Manzione
Justin Brady
Tony Graf

City Council Members Excused:
Ed Hansen

City Employees Present:
Andrew Aagard, City Planner
Paul Hansen, Tooele Engineer
Roger Baker, Tooele City Attorney
Mayor Debbie Winn

Minutes prepared by Katherin Yei

Commissioner Sloan called the meeting to order at 7:00 p.m.

1.Pledge of Allegiance
The Pledge of Allegiance was led by Commissioner Hamilton.

2. Roll Call
Melanie Hammer, Present
Nathan Thomas, Present

Chris Sloan, Present
Tyson Hamilton, Present
Weston Jensen, Present
Paul Smith, Present
Melodi Gochis, Present
Alison Dunn, Present
Matt Robinson, Excused

3. Decision on a Conditional Use Permit Request by the Tooele County School District to Authorize the "Public School" and "Public Educational Facility" Uses for the New Deseret Peak High School on Approximately 57 Acres Located at Approximately 2200 North Berra Boulevard in the RR-5 Residential and GC General Commercial Zoning Districts.
(Continued from February 9, 2022 Meeting)

Mr. Aagard presented information on the 57-acre parcel for the Toole County School District requesting a Conditional Use Permit for a public school and education facility. A public school does require a Conditional Use Permit in the current zones. A site plan was provided. There us a large parking area on the South and the West and sport fields on North and the East. There are access points on Berra Boulevard and 120 East with discussion on making improvements to Berra Boulevard. The Conditional Use Permit request was tabled for 30 days until the City and the School District could reach an agreement. An agreement has not been reached. The staff is recommending approval with the conditions listed in the staff report.

Mr. Baker clarified information regarding the meeting the day before between the City and the School District. A lengthy discussion took place with the issues of the perimeter roads. It was an amicable meeting. Tooele City is of the opinion the full perimeter roads continue to be necessary for student safety. "Full" means curb, gutter, and sidewalk, and 30 feet of asphalt, along the Berra Boulevard and 2400 North perimeter roads. The school district has a different perspective. The discussion is not an argument, but rather a difference of opinion about the interpretation of "reasonably necessary for student safety" in state statute. They are pursuing ways to resolve the difference of opinion to make this project successful and to maintain the positive relationship between the City and the District.

The Planning Commission shared concerns regarding the improvements of the perimeter roads and safety for the students. They shared the following concerns:
Berra Boulevard is not yet finished, what are the City requirements for the improvements?
The roundabout needs to be redone. It is not big enough for buses and additional traffic.
Having a one way in, one way out is an unsafe for all parties. What are all of the access points.
There will be a lot of traffic for a small area with parents, students, and staff. There needs to be better safety.

Mr. Baker addressed the Planning Commission. Many issues are being addressed by the school district engineer and architect. The West bound lane of 2000 North as it passes the hospital narrows from two lanes to one. That will be widened to two lanes from SR-36 to Berra Boulevard and a section of the roundabout. They do have studies that address vehicle number

counts and adequacy of capacity, but he has been informed that safety is not part of traffic studies; rather, traffic movement is the main consideration. If conditions are going to be a part of the motion, the Commission must first articulate the anticipated adverse impacts the condition use is going to create, and only then identify condition that will mitigate those impacts**.**

Mr. Aagard addressed the Planning Commission concerns. Berra Boulevard is 84 foot right of way; the adjacent development is required to improve their frontage, 30 feet of road and park strip. 120 East is an access to the parking lot. The existing road will connect to the parking lot. They are required to follow the City's requirements, including the sidewalk. The District should do a portion of the repairs to the adjacent roads. Development will occur and will have to do improvements to the other parts of the road.

Mr. Hansen spoke to the traffic concerns. The Northeast quadrant is the heaviest traffic area they plan to expand. The traffic engineer stated the other three legs can function without modifications. The school is projected to have 1800 students at capacity. A FEMA channel cuts through the property. The layout the school district gets them started the quickest.

Michael Garcia, the construction expert for the school district, addressed the Planning Commission. Tooele County School District would pay for the road with the option of bringing in a third party to speak to the legality and safety requirements of the roads. If the third party agrees with the school district, the City would be responsible for paying for the improvements of the roads.

Mark Earns, the Super Intendant for the school district, spoke on the road disagreement. There are different interpretations of the law for reasonable student safety. They are going off experts they work with. There are two options once the third party looks at the safety and roads. Based on risk management, if it is a safety issue, the district would pay for it. If not, they would not make improvements and pay for the road. The City can require the applicant to pay for the road if it is reasonable for students' safety. It

The Planning Commission discussed how to mitigate their concerns. The concerns included safety, access from the turn on Highway 36, round about, and access points on 2400 north. They discussed extending the single merge to two lanes by the hospital, and the school district modifying the northeast quadrant of the round-about.

Mayor Winn addressed the Planning Commission. There was a great discussion regarding the road improvements. The City and the school district would like to work together to make the project successful. Tooele City has done enough research and believe it is for safety issues. They have learned about traffic from the current high school and junior highs. They would like to give them a go ahead and put the bid out.

Commissioner Hamilton motion to approve a Conditional Use Permit based on the findings and facts listed in the staff report with the additional condition to improve Berra Boulevard and 2400 North to the City code. Commission Gochis seconded the motion. The vote was as follows: Commissioner Hammer, "Aye", Commissioner Thomas, "Aye",

Commissioner Gochis, “Aye,” Commissioner Hamilton, “Aye”, Commissioner Sloan, “Aye”, Commissioner Jensen, “Aye”, and Commissioner Smith, “Naye”. The motion passed.

Mr. Baker made a point of clarification. If a legal determination is made that the District is exempt from building the perimeter roads Berra Boulevard and 2400 North, this does not mean that the responsibility of building roads then becomes the City’s responsibility. If the District is exempt from the road requirement, then no one is responsible to build these roads. The question is if it is the district’s responsibility. Transportation impact fees could not be used for the project because the City does not have and does not qualify to have a transportation impact fee for these roads; there are no federal or state grants available for these roads; the City cannot sell a bond to finance the roads because there are no sales tax or other revenues available to pay the debt service; there is only the general fund containing property taxes paid by the general Tooele City property owner.

4. Public Hearing and Decision on a Conditional Use Permit Request by Pride Built Homes to Authorize a “Contractor’s Storage Yard” Use on Property Located at 356 South Tooele Boulevard in the LI Light Industrial Zoning District on Approximately 1.5 Acres

Mr. Aagard presented information on a Conditional Use Permit for a Contractor Storage yard located near 200 West and Tooele Boulevard. The applicant is proposing to have business related storage and office space. The Site Plan is being reviewed with minor changes. A corporate office is permitted, but a contractor storage does require a Conditional Use Permit. Chain-link fence will be put up, as staff does not see use for a solid fence. Staff is recommending approval with conditions listed in the staff report

A public comment was received from Jared Stewart with positive recommendation to approve the Conditional Use Permit.

Commissioner Sloan opened the public hearing. No one came forward. The public hearing was closed.

The Planning Commission showed concerns about the fence fabric that may be required to obstruct a possible unsightly view.

Mr. Aagard addressed the Planning Commissions concerns. The site plan shows a chain link fence without fabric.

Mr. Baker clarified it is not appropriate to list conditions for uncertain things that may or may not occur in the future, but rather to identify evidence supporting the actual anticipated adverse impacts, and then to impose reasonable condition that mitigate those impacts.

Commissioner Hamilton moves to approve conditional use permit Conditional Use Permit Request by Pride Built Homes to Authorize a “Contractor’s Storage Yard” Use on Property Located at 356 South Tooele Boulevard in the LI Light Industrial Zoning District on Approximately 1.5 Acres based on the findings in the staff report. Commission Hammer

seconded the motion. The vote was as follows: Commissioner Hammer, "Aye", Commissioner Thomas, "Aye", Commissioner Gochis, "Aye," Commissioner Hamilton, "Aye", Commissioner Sloan, "Aye", Commissioner Jensen, "Aye", and Commissioner Smith, "Naye". The motion passed.

5. City Council Reports

Council Member Manzione reported on items discussed and approved during the City Council Meetings. The items are as follows:
The project located near 3 O'Clock was approved to change the Land Use from Medium Density Residential to High Density Residential with the cap at MR-10.
The property located near 300 West and 100 North was rezoned to MR-16.
The McKellar rezone was denied.
PAR tax is renewed every ten years and was approved to add to the ballot for a vote.
The layout of the minutes was updated to add more detail without having the length of the pages.
The Annexation policy will have revisions.

6. Review and Approval of Planning Commission Minutes for the Meetings Held on February 9, 2022 and February 23, 2022.

There are no changes to the minutes.

Commissioner Thomas moved to approve the February 9th and February 23rd minutes. Commission Jensen seconded the motion. The vote was as follows: Commissioner Hammer, "Aye", Commissioner Thomas, "Aye", Commissioner Gochis, "Aye," Commissioner Hamilton, "Aye", Commissioner Sloan, "Aye", Commissioner Jensen, "Aye", and Commissioner Smith, "Aye". The motion passed.

7. Planning Commission Training on Open and Public Meetings.
Mr. Baker presented information on open and public meetings.

8. Adjourn
Commissioner Sloan adjourned the meeting at 8:46 p.m.

The content of the minutes is not intended, nor are they submitted, as a verbatim transcription of the meeting. These minutes are a brief overview of what occurred at the meeting.

Approved this ____ day of March, 2022

_____
Matt Robinson, Tooele City Planning Commission Chair